REPORT RESUMES

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THE NEEDS OF EDUCATION FOR TELEVISION CHANNEL ALLOCATIONS.
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NATIONAL ASSN. OF EDUCATIONAL BROADCASTERS
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THIS REPORT IS BASED ON A STUDY DESIGNED SPECIFICALLY TO BRING INTO FOCUS THE NATIONAL PICTURE OF TELEVISION FACILITIES FOR EDUCATION THAT WILL BE NEEDED DURING THE NEXT DECADE. THE SURVEY INCLUDED ALL THE LARGE SCHOOL SYSTEMS IN THE COUNTRY WITH ENROLLMENTS OF 12,000 OR MORE, A NUMBER OF THE SMALLER SYSTEMS, AND ALL THE STATE DEPARTMENTS OF EDUCATION. THE FIRST PART OF THE SURVEY DETERMINED THE EXISTING NEEDS IN EDUCATION THAT COULD BE SATISFIED OR HELPED BY THE USE OF BROADCAST TELEVISION. THIS PORTION OF THE SURVEY WAS ALSO CONCERNED WITH THE NUMBER AND DISTRIBUTION OF CHANNELS WHICH WOULD BE REQUIRED TO MEET THESE NEEDS. THE SECOND PART OF THE SURVEY FOCUSED ON (1) ADEQUACY OF PRESENTLY RESERVED CHANNELS FOR HANDLING ESTABLISHED NEEDS, (2) CHANNELS AVAILABLE UNDER PRESENT RULES THAT COULD BE ADDED TO THE RESERVED LIST FOR A PRIMARY, NATIONWIDE SERVICE, AND (3) ADDITIONAL CHANNELS AVAILABLE TO PROVIDE MULTICHANNEL SERVICE. IN THE SURVEY BASIC AND MINIMUM NEEDS OF EDUCATION HAVE BEEN ESTABLISHED, AND A SCHEDULE OF TELEVISION CHANNEL ASSIGNMENTS PRODUCED TO PROVIDE FOR APPROXIMATELY 75 PERCENT OF THE NEEDS IN THE NEXT 10 TO 15 YEARS. (JC)

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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THE NEEDS OF EDUCATION
FOR
TELEVISION CHANNEL ALLOCATIONS

A Survey by the

National Association of Educational Broadcasters

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

OFFICE OF EDUCATION

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PREFACE

This report is based on a study designed specifically to bring into focus the national picture of television facilities for education that will be needed during the next decade. To accomplish this the various areas and levels of the nation's educational structure was appraised, and its community queried. It is hoped that in a large measure it has succeeded in reflecting the patterns of the future. The report of the study is not presented as an exhaustive statistical analysis of data which can be measured quantitatively. To the data accumulated in the study, the report has coupled the background of factual understanding acquired through experience to reach a logical determination of probability in its inference of the television facilities that will be needed. As such a determination this report is presented.

N. A. E. B. - November, 1961

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Much credit must be given the administrators of the schools, colleges, and universities who took time from their busy schedules to contemplate this problem of needs and to translate their reflections into projections. Credit also is due the members of the Advisory Committee for their counsel and constructive criticism, and to the Regional Consultants and the many other members of the National Association of Educational Broadcasters who selflessly contributed their time, effort, and resources. Cy Braum, engineering consultant of the National Educational Television and Radio Center, gave counsel and advice on engineering procedures. C. M. Jansky and Oscar Reed and their colleagues in the firm of Jansky & Bailey, Inc., contributed much beyond their engineering skills and resources to this study. Acknowledged also are the contributions made by the recorded in-school telecast materials survey team of Jack McBride and W. C. Meierhenry, and of Wilbur Schramm and his staff engaged in the television study at Stanford University. The cooperation and collaboration of these collateral surveys were of immeasurable value in enlarging the scope of this study and evaluating the resultant data.

Summary

Since 1952 the Federal Communications Commission has reserved some 275 television channels of the existing 2,200 for the use of educational television.

By so acting, the Federal Government endorsed the vital importance of education to the growth and development of our society, and the essential role of television as an increasingly necessary aid to education.

Unfortunately, too little has been done as yet in making a reality of television's potential. Only 62 of the channels reserved for educational television are now in operation.

The gap appears all the greater when the broad need of our towns and cities, public school systems, and colleges for educational television facilities is studied. To provide each state, community, and educational complex with the projected minimum number of television channels devoted to informal and formal educational programs, would require not the 62 channel currently established, nor even the 275 channels reserved for this purpose, but well over a thousand television channels -- or more than are presently available in the FCC's Table of Assignments.

The present study was precipitated by the increasing demand to know the needs of the American educational structure for television channels as precisely as possible. To this end the survey assessed the needs of our society for education, and equated them with the resources for meeting such needs. From this equation was derived the proportionate need for television spectrum space in each state, community, and educational complex across the country.

In examining the need for television facilities, one primary concern was that education must extend "far beyond the formal system" of schools, and provide opportunities for continuing education at every stage of life.

Equal attention was devoted to the needs of formal education--the problems confronting the schools and colleges.

Approximately one-third of all the colleges and universities in the United States were surveyed, including all but one of the state university systems. Their reports agreed on several problems:

1. Continuing large increase in enrollments.

2. Lack of campus facilities to meet such increases adequately, and a corresponding lack of resources to provide such facilities.

3. Continuing deficit in qualified college teachers, and extreme shortages in some disciplines.

4. Increasing need to make college and university services available to the community at large for continuing and special education programs.

5. Greater need for systematic extension education and in-service teacher training.

6. Growing demand, especially among state institutions and small colleges, for cooperative use of certain facilities and instructional resources.

7. The fear that the limited space in the television spectrum will be filled before the schools can develop the necessary facilities and techniques for television instruction.

Many of the problems that beset the colleges and universities were reflected in the school systems, though frequently intensified and multiplied. The degree of need, and the use of television to solve their problems, differed by area and community; but the significant fact is that differences were only in degree.

The projected need for television channels by the total educational community in the country were based on information received from five major groups:

1. Colleges and universities
2. Local public school systems
3. State departments of education
4. Local civic and political leaders
5. Active educational television stations.

Extended reports from three or more of these sources were received from all the states and, with few exceptions, each group largely corroborated the others.

The survey included all the large school systems in the country with enrollments of 12,000 or more, a significant number of the smaller systems, and all the state departments of education.

The first part of the survey determined the existing needs in education that could be satisfied or materially helped by the use of broadcast television. This portion of the survey was also concerned with the number and distribution of television channels which would be required to meet these needs.

The second part of the survey focused: 1, on the adequacy of presently reserved channels for handling established educational need; 2, channels available under present rules that could be added to the reserved list for a primary, nationwide service; 3, additional channels available to provide multi-channel service.

There are some 200 metropolitan areas in the United States with populations in excess of 100,000, and 270 smaller centers with more than 50,000 people. All these communities need educational opportunities which can be provided by television, often only by television. Each community, whether large or small, urban or rural, has an equal right to such basic television facilities as can be made available.

The need, obviously, is great, and it is immediate.

Roughly three-fourths of the metropolitan centers, most of the smaller communities, and almost all of rural America, are without educational television. Each group should have frequencies available for such service when it can be established.

Furthermore, it is imperative that the primary educational television channel in a community be available, where ever possible, in the Very High Frequency band. Most of the large population centers are geared for VHF reception. Furthermore, VHF offers greater service coverage at less cost to television centers embracing several small towns and a large rural area.

Unfortunately, under the present rules of the Federal Communications Commission, there are not enough VHF channels available to serve all the needs of education for a primary nationwide system. The survey disclosed a minimum need for 97 additional VHF channel assignments across the country, while only 48 are available. And of these 48, only 31 are located where they fit the pattern of need. Thus, 66 needed VHF channels are not available in the present table of allocations.

A partial solution of the problem would be to "drop-in" additional VHF channels in certain areas. It could be accomplished with a slight easing of present rules that control spacing of assignments, and a directionalizing of antennas.

The remaining deficit must be met with Ultra High Frequency channels, though the use of UHF for primary service is limited to those communities which are equipped for it. It is obviously futile to broadcast on frequencies which cannot be received by the community.

As for the colleges and universities, their administrators agreed generally that the proper use of television could solve many of their teaching problems. And all felt that sufficient channels should be made available.

The following table indicates their position on the need for facilities:

1. Use or plan to use broadcast television	45.0%
2. Concerned with inter-institutional cooperation through television	37.0%

3. Need additional channels	82.5%
4. Present number of channels sufficient for their needs	15.0%
5. Undecided about need for more channels	2.5%

The figures alone do not indicate the extent of the need expressed by the large proportion of the schools. Nor do they bring out the relation of closed-circuit to broadcast facilities. Closed-circuit facilities, wherever used or contemplated, were thought of as additional, and often preliminary, to broadcast facilities.

Most of the schools held that two or more channels were necessary to provide for complex schedules, the number of courses, and the various areas of service. And, as the above figures show, many of the schools felt multi-channel service could be shared effectively, a fact which was considered in computing the need for channels.

The number of channels needed by any school system, or complex of systems, depended not only on the size of the community but also, to some degree, on the scope of use planned. Method of instruction seemed to have some additional bearing upon multiple channel use. Where deficiencies are greater, and instruction by television is planned as total course presentation, or as regular systematic instruction on any basis, the need for channels is greater. All these factors were included in the final projection of total minimum needs for each state.

The school systems in the country reported a greater need for educational television than the colleges and universities. While some states and school systems are far in advance of others, with a less urgent need for facilities, the survey showed that over 95 percent of all public schools had serious curriculum deficiencies or teaching needs. Most felt they could be met, or greatly helped, by broadcast television.

Despite the many differences in local resources for development, most states and individual communities indicated that full development of television facilities was expected within the next ten years, through one means or another.

The school systems, like the colleges, showed a growing desire for a cooperative effort. And in many instances, a beginning could be seen of a closer relationship between the schools and colleges in sharing instructional resources and in academic articulation. Such cooperation was especially apparent where instructional television had been mutually developed, or cooperatively used.

For a number of reasons, the schools indicated a greater demand for multiple channels than did the colleges. Differences between elementary and secondary instruction, and the added pressure of special education departments and junior colleges, combined to increase the need for flexibile schedules and numbers of courses requiring simultaneous broadcasting.

Table No. 6 tabulates briefly, state by state, the results of the total survey. The second part of the survey is more graphically presented in the four sectional maps of the United States with the three different color patterns, which are attached to the Appendix of this report.

The compilation of the data showed a minimum need for 97 VHF and 825 UHF channels to be added to the presently reserved 88 VHF and 187 UHF television channels. This makes a total of 922 channels added to the present 275 educational channels for a grand total of 1,197 channels needed for education.

It soon became obvious that this number of channels could not be acquired from the present table of allocations, nor even "dropped-in" under the present rules. A careful search of the table of allocations in reference to the indicated areas and scope of channel needs produced a table of "additional availability" of 48 VHF and 608 UHF channels, or a total of 656 additional channels that would fit the pattern of need. Twenty-three of this number are "dropped-in" channels which have been engineered in the individual states to fit the local needs. The engineering report does not include these 23 channels but they are included in the previously mentioned statistical table.

In this survey the basic and minimum needs of education have been established, and a schedule of television channel assignments produced to provide for approximately 75 per cent of those needs in the next 10 to 15 years. With a proper consideration for the educational service and a careful revision of rules by the Federal Communications Commission, the other 25 per cent of the minimum television needs might also be provided, and perhaps more.

No extended consideration was given to the present financial ability of the educational agencies to meet their established needs, nor to any present political inhibitions. The minimally established and projected needs were considered only as needs which are well within the capacity of the basic resources of our society to provide.

Introduction

Ten years ago the picture of educational television was fuzzy.

Few had more than an amorphous concept of television as a medium for educational use. Many of those who did at that time have a beginning appreciation of the medium's potential in the process of education were understandably and legitimately ignorant of the actually pressing need developing even then for immediate use of this relatively unexplored facility.

Nonetheless, there was among educators a growing appreciation of mass communication media and a feeling of responsibility for experimentation in this field. Initial demands for spectrum reservations grew largely out of this attitude.

Acting jointly, the educators approached the Federal Communications Commission approximately ten years ago and persuaded it to set aside a portion of the established television spectrum for the general use of education. At that time neither the educators nor the Federal Communications Commission had more than a nebulous notion of the number of frequencies actually needed.

Because educational needs for television were then in a shadow area, the channels finally reserved 2 years later for education have seemed in afterthought to have been assigned in an irregular pattern. But, generally, it was not possible for the Federal Communications Commission, in logic, to follow, in establishing a Table of Assignments, a rigid application of the "priorities" in its Third Notice. And, generally, educators were at the time they received them ill equipped to question the assigned reservations. They could only accept them, often without knowing whether they could, or would, use them.

Population has been one of the important criteria for distribution of assignments. In its Sixth Report and Order the Commission points out that the following table reflects generally the number of assignments made to cities falling within the indicated population groupings:

1950 Population of Cities (Central City)	Number of Channels (Total VHF and UHF)
1,000,000 and above	6 to 10
250,000 - 1,000,000	4 to 6
50,000 - 250,000	2 to 4
Under 50,000	1 or 2

There are, of course, variations from this pattern, the Commission goes on to say, because of the many factors and circumstances that had to be considered in connection with making a final judgment as to the exact number of assignments that should be made for any particular community.

According to its Sixth Report and Order, the Commission also concluded that as a further assignment factor it should provide channels for non-commercial educational services in 46 communities outside of metropolitan areas designated as "primarily educational centers." Certain of these communities were assigned one channel for non-commercial educational use, whereas they would otherwise not have been assigned any channel; others received an additional channel over and above the number of channels they would have otherwise received.

There is little doubt that what amounted in effect to assigning channels to an apparently secondary service to meet an apparently secondary need - coupled with the confusion occasioned by the general intermixture of VHF and UHF channels in the assignment tables - inhibited development of the basic educational service. And educators, pressed at all levels to find physical space for the continually increasing numbers of students, and often hard put to obtain minimum teaching staffs, were wary of venturing into a new and untried method of teaching. These postwar circumstances contributed heavily to limiting effective experimentation and inhibited development of educational television.

Still, the development of the use of television for education during the last ten years has been impressive and significant. The appreciation of the potential of educational television has grown beyond any conceptualization possible at the time the original allocations of channels were made. There has been measurable progress from the experimental to the practical. As old needs have been met by new methods, new needs have been revealed, and the demand for educational television has grown.

During this period of progress there has been little projection by educators, locally or nationally, to determine the real present, or the potential, needs for frequencies for education. As its appreciation of the educational service grew the Federal Communications Commission sought and suggested possibilities of increasing the development of this service. But it found no sure knowledge upon which to base a studied consideration. With an increasing demand for educational television facilities, coupled with the increasing possibility of a re-design of the television channels allocations system, it became urgent for education to acquire some definite knowledge of its needs.

On November 25, 1960, William G. Harley, President of the National Association of Educational Broadcasters, submitted a statement to the U. S. Office of Education on the problem of determining the needs of education for use of space in the television spectrum. In the statement he said:

"At present education has a total of 267 reservations, of which about one-third are VHF and two-thirds are UHF -- for the reception of which there are few receivers. In many major cities, education was assigned only VHF frequencies. The failure of UHF to develop commercially has made it virtually impossible to establish educational television stations on UHF channels in these VHF areas. If more VHF channels are made available, it will be important for education's needs to be presented whenever there is an opportunity for a VHF assignment.

"Moreover, there appear to be growing needs for more reservations in the UHF band to serve the needs for multiple channel assignments in metropolitan areas and to fill out the coverage pattern for developing state-wide and regional educational television networks.

"Many channels will be required to serve future television instructional needs and thorough planning should be done by educators in order to insure that these requirements are met. The Federal Communications Commission is under constant pressure for channel space in a spectrum already crowded and pressure can be expected to increase. Plans for activation of existing reserved channels and requests for additional channel space should include documentation that is as specific and definite as possible.

"Determination of spectrum space assignments will have to be made by the Federal Communications Commission on the basis of total needs. In such considerations, it is imperative that the total needs of education for specialized instructional services, networking, and general cultural programming - present and future - be articulated. It cannot be expected that the Federal Communications Commission should think these problems through and provide its own blue print for an adequate educational television service for the nation. It is the educators, together with the pioneers in the educational television movement, who need to study the educational television requirements of the future. When needs are known, the proper technical planning can be done and the Commission can have at its disposal evidence in a form most useful for assisting in its spectrum space determinations."

Funds were requested from the U. S. Office of Education under Part B of Title VII of the National Education Defense Act to support a program of research. The proposal was approved, and a contract was issued to the National Association of Educational Broadcasters, effective January 1, 1961, to proceed with the survey.

ORGANIZATION AND PROCEDURES

The survey organization consisted of a director, a corps of regional consultants working in the field, an advisory committee of outstanding educators, the consulting engineers, and the various staff members of the National Association of Educational Broadcasters.

An initial meeting of the Advisory Committee and several individual conferences with its members crystallized some of the major problems of the survey and indicated the procedures.

It was determined that data should derive from several sources:

1. Local college and school administrators in the various states
2. State Departments of Education
3. Controlling agencies for higher education in the various states
4. Controlling state agencies for educational television
5. Administrators of active educational television stations
6. Informed community leaders, and representative community interests
7. Representative national educational agencies.

These data sources were then provided with background information to help them establish mental latitudes within which they might relate their contemplated educational needs with television needs. The significance of the survey was explained to them in an individual letter or in a general information sheet. All sources contacted were requested to furnish information, opinion, and projection solely on the basis of need and not to weigh their responses with the factor of budget.

It was emphasized that this survey sought simply to determine the potential need of education for spectrum space. In many instances a suggested list of criteria for evaluating educational needs and relating them to television needs was offered. Principal criteria offered were:

1. Expected increase in enrollment during the next 10 to 15 years, and the impact of increase on the potential supply of instructors and physical facilities and financial resources.

2. Possibility and effect of combining use of instructional resources (human and physical) with other institutions or school systems, through the extended and cooperative use of broadcast television.

3. Present deficiencies in the curriculum --- subject areas now being neglected (because of a lack of teachers, instructional resources, or physical facilities) which might be provided by the use of broadcast television.

4. Curriculum improvement and development --- additional subject-areas which could be provided to meet future needs through use of broadcast television.

5. Opportunities for increasing quality of instruction by expanding use of available research facilities, resource material, and instructional talent through use of television.

6. Possibility of meeting increasing need for continuing in-service teacher education, and advanced study, at reasonable costs.

7. Possibility of providing more and better instruction to such special groups as handicapped children and advanced learners through broadcast television.

8. Opportunities for extending influence and service of school or college into the community through broadcast television by:

   a. Providing continuing education for adults and out-of-school youth under circumstances and at costs which may make general participation possible.

   b. Providing for older citizens regular counseling, advisory, and educational services which may be financially and physically feasible.

   c. Providing service which will tend to improve cultural and social standards of the community.

   d. Extending benefits of higher education through televised credit courses for off-campus use.

Frequently, either the central office of the field consultant was requested to amplify these suggested criteria with further detailed information. These requests were filled.

Before taking the survey to the field, a number of conferences were held with the field consultants and the staff to develop among all participating in it a universal understanding of the specific objectives of the survey. Included in these conferences were a study of the specifications of the survey proposal and consultation with the staff and with the consulting engineers.

It was agreed that the base of the survey was the present problem. This included determination of the present use and development of television for education, and of the present needs of education. It required knowledge of present channel reservations, and the availability, or possible availability, of additional channels under present Federal Communications Commission rules and regulations. It embraced present technical developments.

In the conferences it was spelled out that the primary concern of the survey was with standard broadcast television. Consideration of closed-circuit television in its various forms would be given only where it served to illuminate basic objectives of the survey, or when such attention could be given incidentally without distracting from the primary effort. Survey personnel were advised, however, that consideration would need to be given the possible future use of extra-terrestrial television broadcasting, as from airplanes or satellites, in those areas in which some knowledge has been accumulated.

With these understandings, the following over-all objectives were listed:

1. To determine within a reasonable approximation the needs of education, on all levels, for television spectrum space during the next 10 to 15 years, as a basis for determining an adequate system of educational television channel allocations.

2. To appraise the practical potential coverage of the present educationally reserved channels. From this base determine a table of assignments that will provide a comprehensive primary service to education, established to furnish a basic single national educational coverage compatible with the greatest receiving potential of each community.

3. To determine, from the preliminary data, the variable needs of the different localities for multiple channel use for educational purposes during the next 10 to 15 years; and to support these findings with the determination of a system of allocations which can meet such needs as they occur.

With the consulting engineers, the staff mapped the distribution of population and educational institutions in relation to the present educational television assignments in each state. This was preliminary to objectives 2 and 3. The consulting engineers proceeded in sequence from this base of information.

The regional field consultants were called into conference and jointly briefed on proposed objectives, methods, and procedures. It was determined to conduct the survey through the medium of the personal interview, with a personal telephone interview as the first alternative. No questionnaire was to be furnished the interviewee. Instead, the interviewer would engage the data source in discussion, reporting and evaluating the results concisely on a prepared form or, when special circumstances required such deviation, in narrative form.

During the survey it was impossible to interview some of the school, college, and agency administrators selected as data sources., These were contacted by preliminary and follow-up correspondence. When needed, a list of questions to serve as a guide was sent to the respondents.

The survey central office contacted a significant sampling of all sizes of public school systems in the United States, the chief state school administrators, the directors of operating educational television stations, and national agencies. It also helped field consultants to make contacts and to effect appropriate response by special correspondence and by distributing especially requested information.

When the survey procedures were completed, the data compiled and tabulated, a significant response that included all levels and areas of educational effort was available. It was the first step toward an answer, though an answer in minimums, to education's question, "What is the potential need for spectrum space?"

STATUS OF DEVELOPMENT

Determination of present and future needs of education for television must, at least in part, be based upon the present development of the medium in education, and upon the experience derived during its evolution. As much a part of the development of educational television as the actual construction of stations has been the application of television to the varied needs of education.

In an area where change does not come about rapidly, progress in adapting to this electronic tool in the eight years since the first educational television station went on the air has been a notable achievement in American education. So also has been the progress in construction and use of facilities. Thirty three of the contiguous states and the District of Columbia now (October 1, 1961) have educational television stations. Many of them are, in addition, using commercial stations for part-time educational programming. Of the 15 that do not now have educational television, 11 either have developed state plans to establish it or have communities or schools that are planning individual stations.

An outstanding contribution of this achievement has been the general proof of the effectiveness and long-range economy of educational television, and the emphasizing of the continuing and increasing need for facilities in all areas of education.

Practical development of educational television began in 1953 when the University of Houston went on the air with the first station, KUHT, Channel 8. The following year eight more institutions and communities followed Houston's example. Their path was not an easy one. The seemingly large demands for original capital investment frightened many money-pressed educators. Other needs for educational funds were many, and as yet there was little acceptance by the public of educational television. Despite these handicaps the medium continued to prove itself and to develop. Each step in this development has indicated the need for further development and additional use.

In the continental United States in October, 1961, there are 60 educational television stations on the air. Of these, 40 are Very High Frequency stations and 20 are Ultra High Frequency. Sixteen of the UHF stations are single outlets for educational television in communities in which the majority of the receiving facilities cannot receive them on their frequencies. As a result, their use for public service outside the school or college is highly restricted. Two of the UHF stations are second channels in communities already served primarily by VHF stations. These secondary supplemental channels are used mainly for direct in-school instruction. (See map, Fig. No. 9)

Four other communities have applied to the Federal Communications Commission for a second channel at the time of this writing, and several others report that they plan soon to do the same.

Twenty-two educational television stations now have construction permits, or are in the advanced stage of planning and ready to apply for construction permits. Also, approximately 24 additional channels are in an early planning stage. This activity is well distributed about the country.

There are, as of this writing, four state networks of educational television, and 10 more states are actively planning state-wide networks. Two regional networks are being actively organized, the New England or Eastern States network and the Upper Mid-west Six-States network. The Southern Regional Education Board also has done extensive planning directed toward the establishment of a Southern States network of educational television stations.

One of the most significant efforts in developing instructional television is the experimental Midwest Program On Airborne Television Instruction. After many months of technical and instructional preparation this program went on the air in September, 1961, broadcasting recorded instructional programs from two alternately used airplanes flying at approximately 23,000 feet over Montpelier, Indiana. The pre-recorded lessons are receivable by some 15,000 schools located in all or parts of six mid-Western states. It is reported that some 2,000 schools are participating in some measure in the program at this time. The broadcasts are made on two experimentally licensed television channels in the UHF band--Channels 72 and 76. The newly incorporated permanent organization of M.P.A.T.I. is now preparing to ask that these experimental permits be made regular by the F.C.C., and that four other regular channel assignments be made to the service. *

Some 25 states have developed state plans, or have a central state agency responsible for educational television planning and development.

In considering the "status of the art," it is necessary to remember the important part closed-circuit television has played in this development. It has been particularly important in making large group instruction possible on campuses and in schools where broadcast television was not available; in developing methods and techniques of television instruction, and in serving as a superior kind of audio-visual facility to enhance classroom teaching.

In the continental United States there are more than 300 significant closed-circuit television installations. This does not include small experimental installations of industrial-type, sub-standard equipment in many individual schools. It is in addition to the CC-TV installations in military training centers.

Probably the largest closed-circuit network is in South Carolina. This system has a production center in Columbia and extends in three directions to 11 counties and 31 high schools. Only one channel is now available on this system but the state

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* See Appendix.

anticipates increasing transmission facilities to several channels, and extending the service to some 1,250 schools throughout the state. The existing system is augmented by the use of two commercial stations to broadcast taped programs to school schools that are not yet inter-connected.

Other large systems interconnecting an entire school district or several schools are located in Washington County, Maryland; Anaheim, California; Corning, New York; Cortland, New York; Pocatello, Idaho; Galveston, Texas; and State College, Pennsylvania. Radiating from Austin, Texas, is a CC-TV system which will link 11 colleges and universities in that area. As in South Carolina, the long-distance transmission in the Austin system is accomplished by microwave relay.

One of the most significant factors in the development and use of educational television has been the widespread and encouraging legislative support received in the various states. Thirty-five states have now enacted legislation and appropriated funds for the development of educational television.

Some of this legislation actually provided for state support of educational television construction and operation. Some of it provided matching funds and guidance to the localities, and some of it consisted of enabling acts which made it possible for school systems and colleges to participate in cooperative efforts. The educational television legislation in each state is as varied as is the pattern of development and use. One thing evident in the study of most state legislative support of educational television is that this support has derived from the efforts of the lay public as well as from the educational community.

The following indication of station ownership reflects the variety and diversity of support for educational television:

Non-profit community organizations	21
Colleges and universities	17
Local public school systems	13
State boards of education	3
State ETV authorities	6

Practically all these stations, regardless of ownership, serve nearly all levels of education. This has been one of the happy by-products of cooperative ownership or cooperative use of educational television stations; the schools, colleges, and state agencies have achieved some new understandings of each other's problems.

The closed-circuit television systems ordinarily are owned by the school systems or institutions in which they are located. There are some exceptions. The

South Carolina system is owned and operated by the state on transmission lines leased on an annual rental basis from the telephone company. The Hagerstown, Maryland, system is owned and operated by the Washington County Schools. The Austin, Texas, CC-TV is owned and operated by the state university system. Whatever the base of ownership, each CC-TV system, like the broadcast stations, operates to some extent as an exercise in cooperative effort to improve instruction.

During the past year almost 1,400 school systems, colleges, and universities used television in some form as an instrument of instruction.

The unusual cooperation in educational effort between schools and colleges, and among school systems -- and the collateral legislative support -- is reflected in comments from the various state studies made recently of educational television.

A 1961 report made to the 104th Ohio General Assembly by the Ohio Educational Television Study Commission stated:

> "The medium will have wide application in this state ... it is evident Ohio has made a good start in educational television. There are 4 educational television stations on the air, and 4 additional stations are in advanced stages of planning. Eight institutions operate closed-circuit television systems. All stations and systems are exchanging programs."

The 1960 Nebraska study emphasized the need for a state-wide network of educational television stations for the improvement of instruction and of educational opportunities in that state. Educational television for in-service teacher education is especially important in Nebraska, which has approximately 6,000 teachers who lack college degrees.

The 1960 Maine report on educational television said:

> "The need for educational television in Maine is ample and evident.
>
> By banding together in common educational purpose, it is possible, practical, and economical to provide television instruction which will effectively serve educational needs."

The 1961 report of the Kentucky Legislative Research Commission pointed out that lack of teacher competence and lack of specialized teaching materials are problems in Kentucky education which would be ameliorated by educational television, used cooperatively. The use of educational television in Jefferson County, Kentucky's largest community, was credited with easing the impact of increasing school enrollment.

The 1960 Kansas legislative report said, among other things:

> "Wichita schools have been experimenting with television instruction for the past four years. Wichita school administrators feel that they have proved the value of educational television, both from the standpoint of teaching effectiveness and economics."

The Education Commission of Atlanta and Fulton County, Georgia, in its 1961 report said:

> "A certain capital outlay is, of course, required to introduce television into a school system or colleges. However, over a period of time, if the television facilities are wisely and adequately used, they enable savings in terms of teacher time, and extended services in other parts of the educational program. The 'multiple factor' makes television especially helpful at a time of shortage of qualified teachers. The schools can retain or add hard-to-staff subjects in their curricula."

The Governor's Committee on Educational Television in Arkansas, in its 1961 report to the legislature, queried: "If it is true that many schools do not have good and complete educational facilities, isn't it possible that a pooling of outstanding teaching talent from the various schools and colleges presented over an educational television station might help alleviate the problem?"

In New Mexico the Committee on State-Wide Television for Educational Purposes (STEP) in a March 1961 report stated:

> "The potential value of television to the public schools, the colleges and universities, and the general public remains well above the present levels of achievement. The primary purpose of the STEP commission has been to develop a master plan for the systematic extension of educational television opportunities to every community. The (present) signal can be effectively used in the schools of 42 of New Mexico's 93 administrative units."

A February 1961 report to the Governor of Florida emphasized that the purpose of educational television is to provide a "means of extending the powers of teaching in public education, and of raising living and educational standards of the citizens and residents of the state."

Interest in and development of educational television in one state generates interest and development in neighboring states. Arkansas early in 1961 revived the work of its state committee on educational television and, later in the spring, Mississippi called a state meeting to promote early development of its educational television channels. When Alabama increased the number of its reserved channels, Florida the following year requested the Federal Communications Commission to allocate 12 additional UHF channels to education. Arizona went on the air in 1961 with its second channel, and New Mexico announced its plan for state-wide educational television. The success of educational television in Minnesota inspired the North Dakota legislature to appropriate, for the first time, funds for educational television development in the schools.

So the organizational and physical development continues. But there is much evidence also of instructional development. Research of various kinds is going on and reports of results and conclusions are issued regularly. Professor Egon Guba of Ohio State University in his 1960 report to the North Central Association Conference pointed out that there is considerable difference between instructional television and televised instruction. He suggests that most of the experience to date has been with televised instruction, and that the full effectiveness of television cannot be assessed until more effort is devoted to instructional television and the whole potential of the qualitative modulation of the teaching process by television techniques is brought into play.

This suggestion has great significance in evaluating the "state of the art." The efforts to develop true instructional television as opposed to televised instruction has indicated the need for better facilities, higher standards, better training, and more and different kinds of research. Reports indicate some trends in these directions.

More effort to determine effective relationships between members of television teaching "teams," and to discover the kind of cooperative pre-service and in-service training needed to develop better techniques is being evidenced. Current reports indicate rather wide-spread agreement for research and development in this area.

The original development of educational television was sparked in large measure by the concern for general adult education and by the recognized obligation of the land-grant colleges to foster and promote extension education. There is evidence that general adult and extension education continue to play a highly significant and stabilizing role in the continued development. Most of the educational stations belong to the National Educational Television Network and schedule regular out-of-school and adult education programs. Indications are that this service is appreciating qualitatively as well as quantitatively.

Educational television today is vigorous and progressive. It is rapidly being integrated into the instructional processes of the total educational system. However, many problems, and many inhibitions and handicaps to its full development in helping to meet the needs of education, remain.

The responses received in this survey of the nation's educational community may spell out some of the needs and some of the problems, and point with some clarity to future directions of educational television.

NEEDS OF THE FUTURE REFLECTED NATIONALLY

I. COMMUNITIES

One phase of this study was concerned with needs of the American communities for informal and out-of-school education and information, and for cultural development. Official state reports and legislative actions were studied, and the collective actions and opinions of civic and organizational leaders obtained. Program schedules of the active educational stations have been weighed against indicated need for broadcast time for community programming.

The Advisory Committee and the staff of consultants recommended, when this survey was initiated, that it not be confined to formal education alone, but that it look broadly at the educational needs of the community.

The President's Commission on National Goals said in its report, commenting on education outside the formal system:

> "If we really believe in individual fulfillment, our concern for education will reach far beyond the formal system. We shall expect people to continue to learn and grow in and out of school, in every possible circumstance, and at every stage of their lives."

A 1960 report, on educational television for Maine, pointed out:

> "The general public wants and uses an alternative broadcast service -- informational, educational, and cultural programming which complements commercial broadcasting fare, is available for out-of-school and evening viewing, and is tailored to specialized and minority interests. Here exists an excellent opportunity for continuing adult education. No one can doubt the necessity for an informed and intelligent public in today's world. Educational television through its variety of offerings, can provide this service."

In a report to the legislature in February 1961, the Kentucky Legislative Research Commission stated:

> "An investment in educating adults to the value of education may be more productive at times than increasing school efforts in educating the children."

In this frame of reference the several communities were polled. Nowhere was there found any significant disagreement with these ideas. Civic leaders, educators, and broadcasters all reflected the needs of the communities for opportunities for general adult education and a resource for cultural development. All sources emphasized the present and continuing needs in these areas. They agreed generally that educational television offers the major means of bringing the opportunities and resources of the community to the complexity of individuals within the community.

The only significant differences found among the various sources concerned the means for providing educational television facilities. Complete records of these differences were not kept nor was a complete compilation made of such collateral information gathered during the survey. But the general reports of the various field consultants indicated a preponderant attitude for tax support for such educational facilities, whether for formal or informal instruction. There was indicated also a closer working relationship between the forces of education and the business and professional areas of the community in the development of community television.

In the 48 contiguous states (Alaska and Hawaii have some special problems) over 200 important and representative communities were queried on the question of community needs for educational television. Respondents ranged from the heads of significant civic organizations to political office holders, such as mayors and governors.

Responses revealed major emphasis at the present time is on developing educational television for specific use in the various areas of formal education. Yet there is a wide-spread recognition of the needs of the various communities outside of the areas of formal education. The communities and the community leaders in at least 30 of the states indicated an active concern for educational television as a resource for meeting the informal educational needs of the community. The law which established the Alabama Television Commission states that the commission was organized for the purpose of making the benefits of educational television available to and promoting its use for the inhabitants of Alabama. This principle is reflected in the attitudes of most of the communities and states which have made an effort to provide educational television facilities.

For example, the Colorado legislature in 1960, at the insistence of many of its communities, made it possible for any country or city within the state to use public or private funds, or a combination of such funds, to construct and operate television transmission facilities. In so doing they removed the tax limitations on school and recreational districts for moneys used for such purposes.

The governor's Commission on Educational Television in Arkansas, composed of representative citizens of various communities in the state, recommended to the governor and to the legislature that special legislation be enacted which would provide enrichment programs and adult education for the general public. They underscored their recommendation with a notation that, properly used, such a resource would tend to eradicate illiteracy.

In planning for a possible state network of educational television in Georgia, the Governor's Conference on Education emphasized that: "Continuing adult education is a necessity in today's world, and educational television can provide continuing adult education on the farm as well as in the city."

This feeling of a real need to bring basic and continuing education to the inhabitants of small towns and rural areas was reiterated in several different states.

The Legislative Commission in Kentucky stated: "Educational television is a 'must' for a state predominately rural in population."

Interviews of representative community organizations in Kansas included the Kansas State Medical Society, the Junior League, the Congress of PTAs, the AFL-CIO, and the Press Association, among others. These bodies were generally agreed on the need to cover the state with educational television facilities for continuing adult education. Iowa, a predominantly rural state, indicated through a representative group of its citizens that the present allocations of educational television channels cannot cover the state adequately and serve the needs of the people for adult education.

A community leader in New Mexico declared: "Educational television can play a more important part in adult education, especially in a state such as New Mexico where sparsity of population and great distances limit cultural and adult educational opportunities."

In Southern California a group of educators and representative citizens, meeting in March 1961 to discuss the community needs for educational television, said: "educational television is necessary to provide an additional educational and cultural force within the community."

In Arizona a prominent operator of broadcast stations said: "Educational television is absolutely necessary in the state of Arizona."

These were the sentiments lacing through the survey interviews of all the communities.

Representatives of the League of Women Voters, the American Association of University Women, and the Congress of Parent-Teacher Associations, who, to the degree this could be accomplished, were interviewed in every community, were in agreement on the need of a covering service of educational television. In the American Association of University Women, Miss Lucille Ledwith, of Nebraska, and Mrs. Worley Moss, of Pennsylvania, summed it up for their organization when they said, in essence: "This facility is needed to inform and enlighten the public and to raise the cultural levels of the various communities."

Mrs. Cecil Ewing, of the Maryland Congress of Parent-Teacher Associations declared that educational television has "A tremendous potential for urgently needed public education in public affairs and parent education."

Mrs. Preston Scott, President of the South Dakota Congress of PTAs agreed, but offered the comment that: "We have a greater need than some of the more populous areas for educational television. The entire population would benefit greatly by informational, educational, and cultural programming which would be available."

Mrs. John DeBries, of New Jersey, and Mrs. Norman F. Patten, of Pennsylvania, of the League of Women Voters said, a coverage of educational television would make it possible to present complete information on local and national issues. "Such an information channel is urgently needed," Mrs. Patten emphasized.

These quotations and examples of public expression regarding the need for full coverage in the states by educational television facilities indicate the general response field consultants received in their interviews and contacts. The consultants reported no negative response in regard to the need for community television facilities for general, continuing, and adult education. All reports indicated that the respondents felt that it was only a matter of time until the presently allocated educational television channels would be activated. In most instances the attitude reflected was that these would not be sufficient to meet the obvious needs of the years immediately ahead.

A state-by-state mapping of the distribution of population shows approximately 200 metropolitan areas within the forty-eight contiguous states. These are centers of population containing more than 100,000 people. They are not only marketing centers. They are centers of industry, of education, of cultural development, and of social and political activity.

A study of the location of the presently active educational television stations shows that only 56 of these nearly 200 metropolitan areas are now being served by educational television. Of these 56 metropolitan communities, 13 lack an effective community television service because the active station is on a UHF channel and cannot be received with the majority of receiving facilities in the community. Additional stations which will provide service for four more of these metropolitan communities are being activated.

There remain approximately 150 significant metropolitan communities in the United States which at the present time have no educational or community television service. Study of the location of the presently reserved channels shows that most of these metropolitan communities could not under the present circumstances expect to have any community service within the foreseeable future. A community television service cannot be built upon a channel which is incompatible with the majority of the receiving facilities of that community, and this is the circumstance in which these communities are.

In this situation are 21 key cities which have channel assignments not compatible with the majority of the receiving facilities of the community. Eleven of these 22 cities have already activated their UHF channels, but because of this incompatibility they provide no significant community service. The major use of these 11 UHF stations is for formal education and in-school and specialized purposes. The other 11 key cities, observing the experience of their eleven sister cities see no prospect under existing circumstances of obtaining community television service.

The 11 key cities which do not have an educational service and which at the present time cannot look forward to any general community educational service are: New York, Albany, Syracuse, Rochester, Cleveland, Dayton, Indianapolis, Knoxville, Chattanooga, Los Angeles, and San Diego. The 11 key cities which have active educational stations, but which cannot now offer a general community service because of the incompatability of receiving facilities are: Buffalo, Philadelphia, Columbus, Cincinnati, Toledo, Detroit, Kansas City, Louisville, Atlanta, Norfolk, and Washington, D. C.

This record shows substantively the great need in educational community television for frequencies which are compatible with the receiving facilities in the various communities.

There are in the United States in addition to the metropolitan areas and the rural areas some 270 centers of population which have more than 50,000 people. With one exception, none of these now has any educational television facilities, or access to any significant general education programming.

These smaller communities have in this survey indicated a need for service, but no general community understanding of how the facilities for it are to be provided. Many of them are centers of education and contain institutions of higher learning. Some are the outstanding communitities in their states.

Fifty-three of the 60 educational television stations now on the air were questioned concerning their community service. Their answers:

Some community service	45
Predominant community service	3
No community broadcasting	5
Engage in cooperative community programming	28
Plan to expand community programming	12
Feel they cannot or do not meet the needs of the community	40
Feel they are meeting the needs of the community at the present time but are doubtful of future	3

This table of responses is significant. It reveals a need in some areas for additional channels. It could suggest the conclusion that some educational stations are so involved in formal education that they have little time remaining for general community programming. It could suggest also that in future allocations of television channels for education the needs of community program service be considered separately from provisions for formal education.

The responses in this survey of the various communities to the question of need for community educational television service, study of the population distribution nationally, and consideration of the service patterns of the active educational stations reveal in their cumulative evidence an increasing -- in some cases an urgent -- need for a basic, national, educational, community program service. But before this can be accomplished there will have to be a radical change in present channel assignments, numbers of channels allocated, and in receiving facilities.

THE NEEDS OF THE FUTURE REFLECTED NATIONALLY

II. INSTITUTIONS OF HIGHER LEARNING

There was an over-all national response from the institutions of higher learning concerning their present and future needs, as indicated by their chief executive officers or their designated representatives.

Slightly over 1,000 colleges and universities in the United States, or approximately 50% of all existing institutions of higher learning, were contacted in an effort to develop a clear picture of the needs at this level of formal education during the next decade. Of the institutions contacted by personal interview, phone, or mail, 601 representative colleges and universities responded significantly. This is a sampling of approximately 30% of the colleges and universities in the country, and a response of 60% of those contacted. In this number, all of the state university systems were represented, with one exception.

The approach to this phase of the survey was guided and tempered by other studies recently made and reported. For example, the President's Commission on National Goals said:

> "Enrollments in higher education will double by 1970. To provide a staff commensurate to this growth, and to replace all who resign and retire, we shall need 468,000 recruits in the 1960's. The bill for higher education is going to be very, very large in the years ahead. It is reasonable to expect more discussion of how the money is spent."

In Prospect for America, the Rockefeller Reports enlarged upon this by saying:

> "One may take any of several views of the usefulness of television in teaching. It is important to recognize that present patterns of utilization are simply not going to work, except in a few institutions that are sufficiently prosperous to preserve them. It is important to accept the desirability of a rigorous re-appraisal of present patterns and a courageous experimentation with new patterns. This must include a candid weighing of essentials and non-essentials in the curriculum; more flexible and imaginative approaches to the problem of class size; and -- at the level of higher education -- the trying out of approaches that place more responsibility on the student for his own education."

These ideas and predictions were corroborated by the survey statistically, and by the projections of informed opinion by leading college administrators. A small number of the institutions were hesitant to project increases in enrollment into the next decade, but the majority were willing to make conservative estimates based upon their present trends. The estimates ranged from 5-10% a year, for the next ten to fifteen years, as a minimum. In many instances the sources considered them extremely conservative estimates. Readings and interpretations of the enrollment trends in the various institutions made in the course of this survey substantiate the statements and predictions of other reports. But the informed opinion and definitive statements of representative college and university administrators lend an even more substantial basis to bare statistical tabulation.

Dr. Novice G. Fawcett, President of the Ohio State University, wrote a rather detailed reply to the question of needs. In part he said,

> "In the survey of the needs of education for television spectrum space, you are conducting an important undertaking which has vital implications for the educational establishment in this country, and I am happy to respond.
>
> "Several of our people on campus have helped me to think through this problem: Dr. Ronald Thompson, Executive Dean of Special Services, and author of 'The Coming Tidal-Wave of Students', the first definitive study of the effect of successively increasing waves of population on our educational institutions; Dr. Jackson Riddle, in the office of Instruction and Research, who holds major responsibility in the development of our University-wide program of instruction; and Richard B. Hull, Director of the Telecommunications Center.
>
> "Several things seem clear:
>
> 1. The college and University student populations will continue to grow. Dr. Thompson believes the enrollment cataclysm in higher education may well occur in the 1963-65 period, rather than in the 1970's, with a 50% increase of the number of students entering college, posing new demands on educational resources already stretched to the limit.
>
> 2. Every aspect of educational technology which holds promise in improving and extending educational resource needs should be explored. Television appears to have high potential in this respect, and our exploration in this medium at Ohio State University and in Ohio is already well under way.
>
> 3. The electro-magnetic spectrum is already a crowded highway. As the resident and extension student population grows, and as new demands for instructional quality and content emerge, so will the demand for educational access to the television spectrum grow and increase. One example: from 1957 through 1961, instructional television enrollment for WOSU-TV increased

from 574 to 59,080 students. Next year if new instructional television demands on the Columbus campus alone (to say nothing of the four university branches) are to be met, we shall need at least one additional television system. While the closed-circuit system might meet our campus needs, it does not answer the problem we face in the branches, or in the programs of continuing extension education. This is 1961 -- not 1970!

4. The Ohio State University off-campus academic centers were established to meet the needs of students during their first two years of university work. Thus, they might enroll in branches near their places of residence, and then continue their senior college work on our central campus. Dr. Riddle believes that unless we are in a position to provide the off-campus centers with instruction exactly comparable to that received in Columbus, these students will inevitably move to Columbus for their instruction. Anticipating this problem in part is the just completed study of the Ohio Interim Educational Study Commission whose recommendations to the 104th General Assembly call for a 26-station network interconnected by a two-channel reversible microwave circuit system. I should point out, however, that the plan calls for one-channel network broadcast distribution, and even before action has been taken on this plan, it is apparent that several broadcast channels will be required. (This, of course, is a lesson taught us by the Hagerstown experiment which attempted to solve its problem with a six-channel closed-circuit system, and MPATI which, with an airplane, seeks the same solution through broadcast means.)

5. If a sufficient number of broadcast educational television channels is not available during the next 10-15 years in the case of the Ohio State University off-campus centers, we must seek some means of multiple channel microwave relay interconnections. This solution is only a partial solution since it would provide point-to-point communication. In addition, I suspect this would present another spectrum allocation problem in the television area.

"Summing up, it seems to me, that the problem is clearly one of growing demands by education for access to limited spectrum space, a problem which has been complicated by demands by non-educational agencies for access to the same resources. Hopefully, technology may provide new ways and means of using the spectrum more efficiently. In any case education should seek to stake out the largest possible share of the spectrum in order to protect itself against the future."

This thoughtful and comprehensive statement by the head of one of the largest state universities was emphasized and enlarged upon by many other college administrators throughout the country. Among their significant statements were:

"If broadcast television facilities were made available to us we would attempt to alleviate the shortage of classrooms and teachers by broadcasting certain courses taken by large numbers of students. It is anticipated that a number of the beginning courses could be handled on television. Moreover, we believe broadcast facilities would enable us to enrich the courses now offered, by having students view certain parts of the course on television. Other educational programs would be broadcast, supplementing the work of the classroom.

"We anticipate further increased enrollment, and our legislature has failed to appropriate any funds for additional classroom space; therefore, we shall have to use every possible means to reach the increasing number of students we expect to have. I think the use of television will be increasing over the next few years."

George W. Starcher, President

University of North Dakota

"We see an extremely bright future for educational television and a great potential for service to the people of our state. Our institution plans to use television in the future, not only for formal instruction, but also for general extension education. We have confidence in the future of UHF television and feel that as more and more UHF stations come on the air, the gradual switching of all stations to this band may be the solution to the allocation problem. Educational institutions will certainly make use of all channels reserved for them, given sufficient time, and if there is to be any change in the number of channels reserved, it should be an upward revision."

Oliver S. Willham, President

Oklahoma State University

"In North Dakota we are faced with a shortage of skilled teachers. For instance, elementary teachers in this state can teach school with only two years preparation. Television could help solve this problem, if we could present a master teacher by television as an associate teacher, working with a less prepared teacher. The curriculum, and the teacher, and the teaching would be more effective.

"Television would also be important in providing service in special fields of education. Art and music, for example, in many areas has never been taught adequately. Physical education in the grades has also been slighted. The reason of course is that in the smaller schools the classroom teacher does everything. He has not had a chance to be versed in everything. Television would be a welcome assistance.

"The contribution most needed by television on the high school level is in the field of science and certain areas of the social sciences. The social sciences as they are being taught are pretty much a dry, dull, textbook rehash. Social science needs a shot in the arm, something to bring it alive.

"I definitely feel that the allocation of television channels strictly for educational use is important. It can and will help meet the cultural and educational needs of North Dakota."

Dr. O. A. DeLong, President

Dickenson State Teachers College

"We need greater sharing of the best teachers, and educational television will make it possible to do so on an enrichment or supplemental basis. Interdisciplinary presentations would reach more students than they do now, one section at a time. It is needed now to afford flexibility and adaptability to our teacher training program."

Donovan Moffett, President

Cortland College of Education

State University of New York

"I foresee the possibility of a channel fully utilized by eastern Montana college programs in five years with a further channel needed for interchange of instruction, or diversification of offerings. I strongly recommend the reservation of two channels for higher education in Billings, Montana."

Hurbert L. Steele, President

Eastern Montana College of
Education

"We expect to have a considerable increase in enrollment during the next ten years. Just how we shall be able to take care of this increase in enrollment has not yet been determined. Perhaps the answer will come from the use of broadcast television."

H. Russell Beatty, President

Wentworth Institute

Boston, Massachusetts

"Presently we need to do something about reducing our faculty load, since our student-faculty ratio is over 20 to 1. We are also badly in need of science laboratories and considerably expanded classroom space to take care of our rapidly increasing enrollment. Part of the care of this increased size of student body should certainly be brought about by the use of broadcast television and closed-circuit television."

Harold E. Hide

Plymouth Teachers College

Plymouth, New Hampshire

"In my opinion, most universities that are rapidly expanding have certain weaknesses or deficiencies which might be helped by the use of broadcast television. It is also my belief that although these weaknesses are not too obvious at this point, they will be greatly increased in a short period of time. Broadcast television certainly has characteristics which make it an ideal tool for teaching. With a rapidly increasing enrollment and increased building costs, it is apparent that every available method must be utilized to provide an adequate college education for those qualified individuals. I am certain that as a state university we could fulfill our obligations better through the use of broadcast television."

J. Patrick Kelly, Director

Communications Center

University of Nevada

"There is urgent need for a substantial increase in faculties, classrooms, and enrollment at this college in the years ahead. Currently we are accepting one out of three for admission to the freshman class. Fortunately the majority of our faculty members are well qualified in their fields of specialization, but it is doubtful that we can maintain our present high standards for faculty employment unless salary schedules are substantially increased and unless the graduate schools of the nation become really concerned about preparing an adequate number of well-qualified college teachers.

"We estimate that our enrollment will more than double in the next five or six years, and that it will increase substantially beyond that figure in the next 10 - 15 years.

"As the institution grows, at least a low-power UHF transmission facility should be available, and in view of the centralized location of this institution a full-power VHF channel should be reserved. As the use of video-tape becomes easier, transmission to regional schools would almost automatically occur."

Hurbert D. Welte, President

Central Connecticut State College

New Britain, Connecticut

"Educational television would assist in meeting the problems of too many students and too few college teachers. This probably will be the only available answer to these enigmatic conditions."

Carey B. Stabler, President

Little Rock University

Little Rock, Arkansas

"Our experience with operating Channel 71 has lead us to conclude that low-power, multiple channel broadcast television is a relatively low cost solution to many of the problems which we face on the campus. For example, our present enrollment of approximately 10,000 full-time students is expected to double in the next decade. We will have to depend upon television to enable us to provide first-rate instructors to many of the classes. The ubiquitousness of broadcast television is a great asset in meeting this problem."

O. Ray Olpin, President

University of Utah

Salt Lake City, Utah

"Through the experience of existing educational channels in Madison and Milwaukee, it has already been established that television has served well the instructional purposes of educational agencies in a variety of ways and of all instructional levels. With the increasing demands for educational opportunity manifest in mounting enrollment and a growing interest in adult education, we feel certain that television will prove to have continuing utility as an instrument of education."

"In Wisconsin, we anticipate particularly the future need to provide for the sharing of educational resources through the inter-linking of the Madison campus to the University of Wisconsin campus at Milwaukee and with extension centers and state colleges throughout the state. To accomplish this, it is our conviction that the best possible television channels must be made available to the forces of education."

L. H. Adolfson, Dean

University Extension Division

University of Wisconsin

"In the Philadelphia-Delaware area, with many colleges able to contribute broadcasting talents, the available broadcast time is almost disastrously limited, especially for television broadcasting. The educational service of our institutions at all levels can be greatly accelerated by a significant increase in broadcasting facilities."

Sculley Bradley, Vice Provost

University of Pennsylvania

"The Medical School is planning to develop a graduate program, and it is planned, if money is available, to use broadcast television. The university is generally exploring its use in all of our scientific and technological curricula. We definitely hope to use it in the biological sciences."

Edison Montgomery, Director

Institutional Planning

University of Pittsburgh

"The higher education establishments in the Los Angeles area include one present and one future campus of the University of California, as well as four major state colleges, and more to come; it includes the University of Southern California, and fourteen other independent colleges and universities, and it includes perhaps a dozen or more two-year colleges, some of which have enrollments as large as those of the state colleges. It would appear that differences in curriculum among such institutions of such number and diversity imply that a half a dozen channels will not serve the varied needs of broadcasting to classrooms during the limited number of hours when school is in session on a given day. Fifteen channels would make a bare minimum, assuming that at least one is a VHF channel and six are high-power UHF channels and eight are low-power UHF channels. With the population and the schools that are in prospect here, even fifteen channels would have to be multiplexed or otherwise divided before long. No other major population center has as wide spread and complex a distribution of peoples, schools and types of terrain."

Dr. Kenneth Harwood, Head

Department of Telecommunications

University of Southern California

Los Angeles, California

While the foregoing definitive statements indicate the trend of impact and the general need, these trends and needs in many instances do not apply to the older and privately endowed institutions, large or small. Many of the responses to the survey evidence an inclination on the part of many of these institutions to "hold the line" at their present level of enrollment and of academic service. However, many of the older, and especially of the smaller, private institutions have mixed feelings and indicate uncertainty either of their future direction, or of their particular place in the future pattern of things in higher education. An example of this desire to be a part of the change and of the forward movement in meeting impacts of the future, but of indecision as to how to accomplish it is indicated in a letter from Dr. Robert W. McEwen, President of Hamilton College:

"Hamilton, like most small liberal arts colleges, is making no present use of educational television and has no present plans for its use into our program.

"We are well aware of the promise of this medium, both for the improvement and as offering some potential reduction in educational costs. The faculty of such a college could contribute to the development of lectures on tapes which will be needed.

"What is lacking in the small college is any understanding of the ways in which we might be able to cooperate in getting educational television at the college level rolling. I fear that Hamilton, like most small residential institutions, will have to wait on the leadership of educational associations, or the state, and then offer its cooperation, if somewhat tardily."

The survey determined that many of the smaller institutions recognize the various national impacts upon the educational facilities of the country, and want to participate in meeting the problems. These smaller institutions offer a resource for providing quality instruction through broadcast television. A large number of them indicated that they were actively planning or had given serious thought to cooperation with other institutions in the use of broadcasting television, in the future.

While a number of institutions indicated that they have no need at present or in the foreseeable future for broadcast television, there was no locality or educational complex which did not in some measure see in the future a need for the multi-use of television for education.

Analyzing the educational complexes, locality by locality, the study found an almost unanimous indication of need and -- which might be interpreted as even more important -- an indicated trend to inter-institutional cooperation among colleges and universities, and a further trend of cooperation between higher education and public schools.

Statistically, the results of the survey are rather definite and fairly simple. Of the colleges and universities contacted, 601, or approximately 60%, responded. Of this number all but a small minority indicated that they expected an extremely large increase in enrollment each year during the next ten years. This expected increase varied according to the kind of institution and its location, but the range of expected increase within the next decade was from 50-100%, as a conservative estimate.

Present use in some measure of broadcast television was reported by 106 institutions. Plans to use broadcast television to some extent were reported by 172 colleges and universities. So, of the 601 colleges and universities cooperating with the survey, 278 (or 45%) of those reporting are now using broadcast television, or they are actively planning to use broadcast television soon.

This does not tell the whole story. Some of these institutions now operate their own broadcast stations and some cooperate with other institutions or with community educational television stations. Others are using either donated or purchased time on commercial stations in order to achieve their immediate objectives. In most instances, the institutions not now operating their own stations are cooperating with a school or community educational station. This indicates a need exists and that additional channels will soon be needed to meet the demands of the curricula and instructional schedules. The same is true of many of those institutions now in the planning stage of instructional television. Those in this stage of development feel it extremely important to get their additional programs under way, to master the medium, and to learn how best to use it. In most instances recorded in the survey, those with serious plans for use of the medium for instructional purposes, indicated that effective service of the needs of the university in both on-campus and extension work, would require more than one channel in the future.

Some institutions that use broadcast television also have a closed-circuit installation, or have plans for closed-circuit television installation. Many institutions which have not been able on their own initiative to plan for broadcast television, smaller institutions which must wait until some sort of cooperative arrangement or community establishment can be effected, have already installed closed-circuit television for on-campus instructional purposes. Many other institutions of this kind - both large and small- have planned closed-circuit television installations.

A number of institutions reporting such installations in use or planned for the future indicated that this was only a part of their total television picture, and that such installation did not replace or supersede the use of broadcast television. There was some indication that for on-campus instructional purposes, low-power broadcast television might be used instead of cable distributed closed-circuit television. Agreement was general that within the next 10 years a combination of all types of transmission systems would have to be employed to meet the demands of higher education and their collateral agencies.

Present use of closed-circuit television was reported by 96 colleges and universities within this survey, and 162 institutions reported plans underway to install closed-circuit television, for instruction. This demonstrates that 43% of the reporting institutions are either now using or planning to use closed-circuit television.

Earlier, this report noted a trend to cooperative effort in the use of broadcast television. Tabulation of survey responses shows that 91 colleges and universities (or 15%) of those reporting are now engaged in a cooperative effort of one kind or another, and that 134 institutions plan future cooperation with other institutions or agencies. This means that 37% of these institutions are now to some degree concerned with inter-institutional cooperation.

It is difficult to evoke from the colleges and universities a definite answer to the question of future need. Many institutions feel they are in a period of change and growth, a period of development of new processes which cannot at this time be completely nor accurately determined for a ten-year period. But a reluctance to make specific institutional commitments proved not to be a measure of reluctance to indicate general need. As one college president put it,

> "I would hate to say at the present time that we are going to need two channels in the future, when five years from now I may find out that

we will need six channels; on the other hand I certainly want to be sure that we register our awareness of the fact that we are going to need channels."

A future need of more broadcast television channels than are now available to them was indicated by 321 colleges and universities (or 53.5% of those responding in the survey.) A number of institutions indicated a foreseeable minimum need of channels for various instructional purposes. Some indicated a minimum of two channels for the institution or group of institutions they represented; others indicated as many as six channels as a minimum for future use. Estimates of need ranged up to the minimum of 18 channels of varying power quoted earlier as the total educational complex estimate for the Los Angeles area.

This study shows a majority of the colleges and universities in agreement that they will need in the future many more broadcast television channels than are now available to them. This was reflected in the response to the question of additional reservations to meet future needs. Of the colleges and universities responding, 82.5% indicated unconditionally that additional channels should be reserved for their institutions or for the institutional complex to which they belong; 15% indicated that they did not believe it necessary to reserve any additional channels for their future use; and 2.5% were undecided whether there should be additional reservations. (See Table 1.)

The preponderance of this positive response evidences the awareness of college administrators of the need for television channels in the future development of higher education.

NOTE: See Table No. 1 on the following page.

Table 1.

Response of Higher Education to the Question of Future Need for Television Channels

	Number	Percent
Colleges and universities responding to survey	601	
Colleges and universities now using broadcast television in some measure	106	17.6%
Colleges and universities now planning to use broadcast television	172	28.6%
Colleges and universities indicating their future need for broadcast television will exceed the facilities available to them.	321	53.5%
Colleges and universities now using closed-circuit television for instruction	96	16%
Colleges and universities now planning to install closed-circuit television for instruction	162	27%
Colleges and universities now cooperating with other institutions or agencies in broadcast television	91	15%
Colleges and universities planning cooperative effort with other institutions or agencies.	134	22%
Colleges and universities which feel additional channels should be reserved for their use or for use of the educational complex of which they are a part	496	82.5%
Colleges and universities which do not feel additional channels should be reserved for their purposes	91	15%
Colleges and universities undecided whether additional channels should be reserved for them	14	2.5%

THE NEEDS OF THE FUTURE REFLECTED NATIONALLY

III. THE PUBLIC SCHOOLS

A third segment of the national picture was reflected by the public schools. A large number of the various-size school systems was polled, and the superintendents and other administrators interviewed. National and regional organizations concerned with public schools were surveyed. The results appear to be definitive.

The National Education Association in its report on educational television issued in spring of 1961, entitled "And TV Too!", stated by the way of introduction:

> "The salient educational fact of our time is that the quantity and quality of our education must be drastically and rapidly increased if our people are to meet successfully economic, political and moral challenges with which they are faced. Our rapidly increasing population, and the increasing number of years of formal schooling demanded by that population indicate the urgency to increase the quantity of educational facilities and opportunities. The even more rapid increase of the world population, the increasing dependency on technology as a governing economic and social factor, and the divergent political and moral philosophies impinging on the peace of the world as well as on our own security make it absolutely essential that the quality of every segment of our education be increased.
>
> "Some school administrators and lay boards on all levels of education believe that educational television, properly and adequately used, can be a major instructional device to accomplish this; that so used, it can improve instruction more economically than any other one medium. If these things are true, it is obvious that television for instructional purposes must be the result of a well-planned, concentrated, and unified program."

The Fund for the Advancement of Education, in its report "Teaching by Television," issued in January 1961, said,

> "Today the question is no longer whether television can play an important role in education. That question has been answered in the affirmative."

The North Central Association of Colleges and Secondary Schools at its conference on television at Ohio State University in the fall of 1960 reported among other conclusions the following:

> "It is certain, for example, that the facility of television is now being used successfully as an educational tool at all age levels. It is clear that students can learn as well where television is used by the teacher as in the conventional classroom situations, and frequently better. It is clear that

> administrators at all levels of education should study ways in which television can be used as an important medium of education.
>
> "The cost of employing television varies greatly in relation to many factors; but it is not prohibitive in terms of normal educational expenditures."

At the Institute for Education by Radio-Television, at Ohio State University in April of 1961, Dr. John L. Burns, President of the Radio Corporation of America, commenting upon the progress of the use of television for instructional purposes, said:

> "The real threat is that progress at this pace might dwindle into no progress at all. In Thornton Wilder's words 'Every good and excellent thing .... stands moment by moment on the razor-edge of danger!' the increasing demands for new skills and higher scholarship coupled with the growing shortages of teachers and facilities give a surgical urgency to the nation's educational needs. What must be done to alter educational television's fragmentized character, to move its electronic signals into classrooms from coast to coast, to link its varied elements in a planned program of growth? Much has been written of educational television's bright promise in terms of individual experiments, but I believe its ultimate promise can be realized only from an overall approach, because the individual experiment is too small to show the way."

The needs of the future for educational television service, so sharply etched by the reports of the communities and the institutions of higher learning, are reflected with even greater intensity in the national study of the schools grades 1 through 12.

Documented in the section of this report "Needs of the Future Reflected by the Several Separate States" is the harsh finding that two-thirds of the elementary teachers in one state have sub-standard qualifications. Another state reports more than half its small high schools have inadequate curricula. Yet another describes a large area in which 1,600 children have no organized instruction. The superintendent of one large state school system, harassed by perennially over-crowded classrooms and an annual shortage of 3,000 to 5,000 qualified teachers, said, "We must share our good teachers and our instructional facilities."

These kinds of reports are documented again and again in the survey responses. They point up the great general need for improved educational facilities; they depict a need for improvement in the quality, as well as in the quantity, of education.

There was, when this study was being organized, a general conceptualization of this need and some opinion of the ability of instructional television to supply a major portion of the need. But to obtain evidence on which concrete planning could be based it was determined that survey consultants should go to the grass roots of public-school administration to attempt to determine in detail the relationship of educational need to need for television channels in the foreseeable future.

In the survey 1,400 representative school systems were contacted by personal interview, by phone, by mail, or by all three means. Forty-eight states were represented in the survey, and 1,113 school systems responded to it.

Information was received from all major school systems. These were considered to be those with enrollments of more than 12,000. They numbered 388 and the ratio of contact was 1 to 1, with complete response.

The second group of schools contacted was that in which enrollment ranged from 3,000 to 12,000. There were approximately 2,000 school systems of this size, and 400 were contacted for the survey, or a ratio of 1 to 5. Approximately 243 of these responded, or 60% of those contacted.

The third group of schools was that in which enrollments ranged from 150 to 3,000. Of the approximately 15,000 systems of this size, 600 were contacted in the survey, or a ratio of 1 to 25. Approximately 502 such schools, or some 83.5% of those contacted, responded.

Of all the schools polled, 543 or some 49% indicated that they were now using television for instruction in some measure. Responses of 419 systems indicated that they planned to use broadcast television for instruction in the future or to expand the facilities already in use. The school systems indicating plans for future use amounted to roughly 44% of those replying.

Of the 744 school systems replying that they were not now using broadcast television, 387 or about 68%, indicated that they had curriculum deficiencies and instructional needs which could be met by the use of television, if facilities were available to them.

Of all the respondents not now using television instruction, 24 school systems, or a bit over 3% said they had no curriculum deficiencies nor instructional needs which could be met by television. Eight school systems, or a little over 1%, said they did not know whether they had any such deficiencies which could be met by television. With the one exception of a school system in group two, all of the negative replies came from group three and from among the very smallest systems within the third group. They reflected lack of experience with instructional television, or were not located close to systems then using broadcast television.

The record is complete on closed-circuit television on only 487 of the school systems reporting.* But, of the 487 so reporting, eight school systems indicated that they were now using closed-circuit television for instruction and 86 systems indicated that they were planning to install closed-circuit television. There was no definite indication of the size, or the extent, of the closed-circuit systems being planned.

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*p. 12, Report on Recorded Televised Instructions by McBride and Meierhenry, states 300-400 closed-circuit installation, exclusive of military operations.

A significant and compelling finding of this segment of the study is (1) over 95% of all 1,113 representative school systems of all sizes -- including all the major systems in the United States -- indicated they now use broadcast television or planning to use it for instructional purposes, or (2) that they have curriculum deficiencies and instructional needs which could be met if broadcast television facilities were made available to them. (See Table 3)

As a footnote to this study the Midwest Program on Airborne Instruction began its experimental broadcasting of in-school instruction via two transmitters located in airplances flying over Central Indiana. The signals covered all or parts of six states and were reported receivable by some 15,000 individual schools. In the Fall of 1961, approximately 2,000 individual schools were reported to be participating in some measure in this televised instruction. (See chapter on Status of Development)

Table 2

Ratio of Responses and Contacts in the Public Schools

	Number	Percent
School systems contacted (all sizes)	1400	.035%
School systems responding to survey	1113	80%
Major school systems contacted (enrollment 12,000 plus)	388	100%
Major school systems responding to survey	388	100%
School systems in 2nd group contacted (enrollment 3,000-12,000)	400	20%
School systems in 2nd group responding to survey	243	60%
School systems in 3rd group contacted (enrollment 150-3,000)	600	4%
School systems in 3rd group responding to survey	502	83.5%

NOTE: The indicated percentage of school systems contacted refers to the significant systems in the total complex of school districts in the United States. Of the more than 40 thousand school districts in the country, approximately 2,500 operate small, incomplete educational programs, and approximately 12,000 districts have only one teacher in one room. The above ratio of contacts and responses refers to the systems which enroll more than 32,000,000 of the school children in the United States.

Table 3

Responses Indicating Present Use and Future Need of Instructional Television in Public Schools

	Number	Percent
School systems now using television to some extent	543	49%
School systems planning future use of broadcast television or expansion of present use	492	44%
School systems not now using television, with instructional needs which could be met by television if facilities were available	387	68%
School systems not now using television, with no need for television	24	3%
School systems not now using television, don't know whether television is needed	8	1%

NOTE: Of all the 1,113 school systems responding to the survey, 1,081, or over 95%, indicated that they either were using or planning to use broadcast television, or had instructional needs and curriculum deficiencies which could be met if broadcast television facilities were available to them.

NEEDS OF THE FUTURE REFLECTED NATIONALLY

IV. STATE DEPARTMENTS OF EDUCATION

The State Departments of Education in all 50 states were questioned concerning the present and future needs of education in their respective states, and their attitudes toward and plans for using broadcast television to meet those needs. In most instances the state superintendents, themselves, framed the answers to the various questions. Generally they were very forthright and definite. They were indefinite only in those areas in which it was evident that their powers and authority were limited by law. Quotations of some of the representative statements will establish a clearer background for the statistical tabulation of the responses received.

Dr. William H. Durr, Deputy Superintendent of Public Instruction for Hawaii, said:

> "Television can be used for direct classroom instruction in science, foreign languages, mathematics, and other subject areas. Television can be used for adult instruction, in language, basic reading, and all cultural subjects, and television can be used in in-service education of teachers. It is expected that with increasing school enrollments, and with general population increases as more people move to the Islands that the needs which television can help to meet will increase."

Dr. Charles F. Carroll, Superintendent of Public Instruction in North Carolina, said:

> "As is true throughout the country, North Carolina is faced with an exploding school population. Numerous steps are being taken to provide quality education for this tremendous increase in students. Instructional television has proved itself in North Carolina as a teaching tool. Increased use of it is necessary to help meet the increasing needs of education. Because television is the most powerful communication medium yet devised by man, it follows that substantial protection must be provided for its use in and by education."

Dr. Alfred L. Villa, of the Connecticut State Department of Education, wrote:

> "As population increases and the complexity of subject matter increases there will be more need for effective, authoritative and updated instruction. Broadcast television can make a great contribution in meeting this need. The present 10% reservation can in no way meet the impending needs of education. Large population centers, in fact, may well make excellent use of two or more broadcast sources."

Dr. Harry J. Skelley, of the California State Department of Education, stated:

> "One of the basic problems in providing educational facilities is that of land space as well as classroom buildings. Adequate availability of television channels, both high-power, which would facilitate multiple channel use could reduce the existing need for educational opportunities for students. This concept would involve at least one high-power station in each metropolitan area, plus four or five low-power multiple channels. The basic presentation of knowledge and information relative to certain subject material fields could be programmed and free teachers for necessary follow-up. There will be need for many television channels for instruction in the future; they must be reserved now."

From the fifty state superintendents or their deputies polled in the survey concerning the instructional needs which would be satisfied or improved by the use of broadcast television, the following responses were received:

Table 4

Broadcast television instruction could satisfy and improve the enrichment of present instruction, provide instruction on current affairs, and provide a source of motivation	5
Broadcast television can meet needs in all areas of elementary and secondary education	43
Broadcast television can meet curriculum deficiencies at the junior college level and provide credit courses for community college	16
Broadcast television can meet pressing needs in adult education	23
Needs will increase drastically during the next ten years	48
Needs will not increase noticeably in the next ten years	1
There is planned use, or planned expansion of use, of broadcast television in the state	44
There is no planned use of broadcast television in the state	1
There is planned expanded use of closed-circuit television in the state	1

Additional television channels for education should be reserved in the state to meet the increased need in the years ahead	48
Uncertain whether additional channels should be reserved for education	2

This poll evidenced that national educational needs as reflected by the state superintendents can be satisfied, or that improvement can be made, on all levels by use of broadcast television. There is evidence also that the observed needs will increase appreciably in the years immediately ahead and that many more channels need to be made available to the various areas of education. Imminent demands on the federal government for access to such channels are indicated by the fact that 44 states are now planning to use broadcast television, or to extend their present use of it. In the one state where effort at the time of the survey was limited to closed-circuit television authorities stated that -- although presently reserved channels there were not yet activated -- they saw definite future need for several more channels for broadcast television to augment the closed-circuit activities.

NEEDS OF THE FUTURE REFLECTED NATIONALLY

V. INSTRUCTIONAL NEEDS REFLECTED BY ACTIVE EDUCATIONAL TELEVISION STATIONS

The educational television stations now on the air were questioned as to the needs of the future as reflected in their present service, and demands being made on them for additional service. In addition to the community programming previously reported, the 60 stations on the air at the time of the survey were offering the following services in some measure:

1. In-school instruction	47 stations
2. Adult education	43 stations
3. In-college instruction	26 stations
4. Off-campus college credit	30 stations
5. In-service teacher education	37 stations

In addition to the community programming and these educational services, the stations all indicated that they have additional demands for both formal and informal instruction which they find very difficult to meet. As a result of these demands, 26 of the stations indicated that they plan soon to ask for additional channels - or at least one additional channel.

The managers and directors of the educational stations now on the air were asked to indicate their anticipated needs for channel space within the next ten years, based upon the present rate of increase in the demand for service from their stations. These responses resulted: 17 were sure that they would need several additional channels but were unable to project the exact number; 9 managers indicated that they would need at least 2 channels; 5 managers indicated that they would need 3 channels; 7 managers indicated that they would need 4 channels; 2 managers that they would have to have at least 6 channels; 1 manager saw need for 13 additional channels within the next ten years, and one manager saw need for an additional 15 channels.

These projections of an indefinite number of channels, or of a specified number of channels, are not based upon the needs of the entire educational complex, but only upon the needs of that area of education which is immediately affiliated with the present operation. In addition to the projections of these station managers for their own observed needs, there are in most of the communities in which these present stations exist other needs for instructional services. These have been indicated by other sources with which the existing stations have not yet come in contact.

TABLE 5

RESPONSE OF ETV STATION MANAGERS TO NEED FOR ADDITIONAL CHANNELS DURING NEXT 10-YEAR PERIOD

Need several but not sure of exact number	17
Need at least 2 additional channels	9
Need 3 additional channels	5
Need 4 additional channels	7
Need at least 6 additional channels	2
Need 13 additional channels	1
Need 15 additional channels	1

NEEDS OF THE FUTURE REFLECTED BY THE SEVERAL STATES

ALABAMA

One of the first to have a state law authorizing such an agency, Alabama has an educational television commission charged with making educational television available to as many Alabama inhabitants as possible. The Alabama Educational Television Commission is the legal owner of all educational television stations now operating in the state, or that will in the future operate there. These stations operate as a network, serving general community needs as well as the instructional needs of the colleges and school systems.

The Commission now operates three VHF channels, interconnected by twelve micro-wave units. In January 1961 the Commission applied for a construction permit to build another station on Channel 26 in Montgomery. Its immediate plan is to establish an additional station in Mobile (UHF) and at least one station in the Tennessee Valley of northern Alabama. It has applied for, and received, reserved channels at nine additional locations.

Present plans indicate that Alabama anticipates during the next ten years a need for at least 30, and perhaps 36, channels to serve an educational network system. When all the presently reserved channels in the state are activated there will be only 18 stations on the air (three of which would be second channels). Alabama will need an additional fifteen channels reserved for educational television.

ALASKA

The vastness of Alaska's geographic area and the state's rugged terrain pose special, and difficult, problems to the planning of use there of television for educational purposes. Nonetheless, stirrings of interest evidenced now indicate there will be demands for channels for education as the state continues to grow, and as its educational demands continue to grow.

Dr. William R. Wood, President, University of Alaska, writes:

> "To the best of my knowledge there are no institutional, community, or state plans in Alaska for the use of broadcast television for educational purposes. However, a university faculty committee has just submitted to me an extensive proposal concerning the development of an instruction center, that involves the use of educational television. I should be very glad to confer at any time concerning the possibility of educational stations in Alaska. The principle areas that might be effected initially would be Anchorage and Fairbanks."

Dr. Theo J. Norvy, Commissioner of Education in Alaska, writes:

"It is unfortunate that television broadcasting is very limited in this state, primarily due to sparsity of population, as well as broadcasting problem. As you know, Alaska is a very mountainous state which poses special problems when it comes to delivering a picture. It may be that the technical difficulties will be overcome -- then educational television would be a most welcome asset. If at any time there is information which we may furnish you, please do not hesitate to get in touch with us. If there are developments in television broadcasting which would assist us, we would appreciate being kept informed."

These responses indicate there will be future needs in Alaska for educational channels. Those needs cannot be projected at this time, because of the problems peculiar to this new state.

ARIZONA

Arizona now has on the air two VHF educational television stations, owned and operated by the state universities. The school systems and educational services generally in the state are exploring ways to meet their needs by additional use of these stations. While relatively small in population, Arizona is the sixth largest state in area. Because of this it is vitally interested in extending its educational television during the next ten years.

Governor of Arizona Paul Fannin writes:

"Educational television in Arizona is gaining expanded interest for the use of television as a medium to augment our present educational system. We already have activated Channel 6, operated by the University of Arizona in Tucson, and Channel 8, operated by Arizona State University in Phoenix-Tempe. These two stations have created a growing interest on the part of many officials of our public schools in the use of television for classroom courses. In the future, consideration of television allocations, I hope that this present use and future needs for additional low-power facilities will be taken into consideration by the Federal Communications Commission."

Richard B. Rawls, vice president, commercial Channel 5 in Phoenix, writes:

"I feel very strongly that education by television is not only an efficient and desirable way to teach those desiring education but unable to attend an institution personally, but I feel emphatically that the development of television education techniques will be absolutely necessary to accommodate the student growth of the future. The exploding population and the greater trend toward self improvement which is apparent to all of us will in the immediate future create a demand for learning in all schools which cannot be accommodated traditionally with plant and qualified instructors. Certainly, one important answer to this problem will be educational television. If it is economically feasible to consider an educational television network development in Arizona, which can be tied in with an educational television network nationally, within the next few years, then let's make this come about, before we find our academic facilities are inadequate to meet the problem."

In April 1961 a meeting of public school and college educators and representative citizens at Arizona State University considered the needs of educational television in the state. Among recommendations of this group - aware of the needs of the state and the potentials of television - were:

1. Additional television channels for educational purposes should be available in the Flagstaff, Safford, and Yuma areas. These transmission channels would be used immediately to pick up programs originating from the two university stations. Later they might be used for local origination.

2. At least two low-power UHF channels should be available to education in the Phoenix and Tucson areas, so that KAET and KUAT could move into multiple transmission as the need developed.

3. The university stations should be linked, to enable them to exchange programs off the air at this time.

4. Engineering studies should be undertaken and long range planning organized to ensure organization of the state to make efficient use of television as a teaching medium in the future.

This report and reports from its schools indicate that Arizona will, within the next ten years, need a minimum of nine additional channels to meet its growing and recognized instructional needs. Should growth in other parts of the state approximate that of Phoenix even more than this number will be needed.

ARKANSAS

An Arkansas legislative committee which studied the educational possibilities of television sponsored a bill in the 1961 legislature to establish a state educational television commission. This commission would be empowered to activate the reserved channels in Arkansas and to procure such additional channels as might be needed. At this writing the legislature has passed the bill and the governor has indicated he will sign it.

The committee was very definite in its decision that Arkansas will need more than the three educational television reservations now allocated it. Arkansas has a problem of coverage from a technical standpoint that is particularly its own. But the committee is convinced that if optimum use is made of television in the state, Arkansas will have ample use for a multi-channel system in the future.

Cooper Burley, member of the study commission and supervisor of teaching aids for the school system, anticipates this full development during the next 10 years. On the basis of the distribution of its population, and the distribution of its student population, an engineering projection indicates Arkansas will need at least nine additional channels reserved for education.

CALIFORNIA

Of all the states, California has one of the largest demonstrated needs for use of television for instruction in its huge complex of higher education and multiplicity of school systems. It has 89 four-year colleges and universities and 31 two-year colleges, with a combined enrollment of approximately 500, 000 students. This number is steadily increasing.

There are approximately 18 major population centers in California and seven small population centers or communities in excess of 50, 000. The bulk of the population is centered in the west-central and south-western parts of the state and concentrated in these areas along the coast. There is a public school enrollment of approximately 2, 830, 000, in addition to those students in colleges and universities.

The need here for instructional television has long been recognized, but a problem of organization and responsibility for facility ownership remains. There was added in 1957 to the education code of California:

> "Section 8857 Contracts for Television Broadcast
>
> The governing board of any school district or the county superintendent of schools acting with the permission and on behalf of such a board, or boards, may enter into contracts, either alone or in cooperation with other school districts, for the purpose of participating in, or the procuring of television broadcast for use in the educational program of the schools. Nothing contained in this section, however, shall be construed as authorizing a school district or county superintendent of schools to own, lease, or operate a television broadcasting station."

This has resulted in school districts contracting, in their experimental and developmental periods with television, with commercial stations and, in northern California, contracting with the educational stations in San Francisco and Sacramento.

But there has been a growing recognition that these arrangements are inadequate; that if the schools alone are to be properly served - particularly in the densely populated areas of southern California - many more channels must be provided.

The Los Angeles Regional Educational Television Advisory Committee, following a March 1961 meeting, reported the need for six channels for high-power operation for use by the larger districts for instructional purposes in the elementary and secondary school, and for adult education; twelve channels for low-power operation to serve the local needs of the districts; and, for Los Angeles, a general educational television service to meet the needs of the community at large.

Dr. Kenneth Harwood at the University of Southern California, studying the Los Angeles area, substantiates the position of the Advisory Committee. He projects, on the basis of educational communication need in Los Angeles, a minimum of fifteen to eighteen channels for instructional purposes within the next ten to fifteen years.

This need in the general Los Angeles area is aggravated by the growth, both north and south of the city, in areas that normally would not be reached by the Los Angeles educational television station.

Dr. P. E. Patterson, Director of Audio-Visual Services for the Orange County schools, writes:

> "In the original allocations made in 1952, Orange County was not considered as a potential location for an educational channel, due to the fact that this county was in a small community and considered a 'bedroom' of Los Angeles County. Since 1952, Orange County has more than tripled in growth and is now considered a separate metropolitan area completely divorced from Los Angeles County. I would like to call your attention to the fact that Orange County has a considerable amount of television being used in the schools at the present time. There are probably between 1,000 - 1,500 television receivers in the Orange County schools and more being added each year. We feel that the schools in Orange County should have their own educational television facilities."

Orange County has predicted a school enrollment of 700,000 at the saturation point and school officials there are very interested in having an initial educational television channel to be operated by the county for all school districts. The 700,000 projected enrollment is the saturation figure. Actually expected at the present rate of growth is an enrollment of approximately 500,000 children in the county within the next 10 years.

In extreme southern California is the metropolitan area of San Diego; and there is a rapidly growing demand for television in the combined school districts, as well as in the growing institutions of higher education there. Reports from both San Francisco and Sacramento areas indicate a minimum need of three additional television channels for instructional broadcasting in those two communities.

California has at this writing six educational reservations that have not been activated. But the evidence presented by the schools and colleges for additional channels needed in the foreseeable future demands an additional 32 channels in California, distributed in the great clusters of population in the south and in the central parts of the state.

This survey contacted directly representatives of the major school districts and private and state colleges in California. Responses showed conclusively that educators on all levels in the state consider television an extremely important element in their planning for providing educational facilities to meet the demands of the future.

COLORADO

Colorado has two major and three minor populations centers, with the majority of the population concentrated in the east-central portion of the state and fairly well within the range of present educational television assignments. There are four channels reserved for education: Channel 12 at Boulder, which is expected to be activated shortly by the University of Colorado; Channel 17 at Colorado Springs; Channel 6, operated by the Denver Public Schools; and Channel 8 at Pueblo.

The major population center in the sparsely settled western part of the state, the Grand Junction area, has no educational television allocation at present. Dr. I. K. Boltz, of the Mesa County Valley Schools, reports that the people of this area have a strong desire to correct this situation.

There are seventeen 4-year colleges and universities in Colorado with a total enrollment of approximately 40,000. There are also seven 2-year colleges with a total enrollment of approximately 3,500. The public school enrollment is approximately 370,000, with the bulk of it concentrated in the large population areas in the east-central part of the state.

At present writing, there are no documented state plans for educational television in Colorado. The only example of activity resembling state action is a committee formed by the State Department of Education to examine the possibilities of educational television.

Lack of official state action to institute a program of educational television use does not reflect a lack of recognition by the various components of the state of an existing need, or a lack of action to preserve and utilize this facility.

The University of Colorado reports that it is installing production facilities and closed-circuit television, expected to lead to an early activation in Boulder of Channel 12, which is now reserved for educational use. The university looks forward to a state-wide network that will eventually have a production center and closed- and open-circuit transmission facilities on the campuses of each of the seven state supported institutions of higher learning.

A further indication of recognition of need is found in the action during the 1960 session by the state legislature of passing Section 4 of 114-11, Colorado Revised Statute, to read:

> "Any county, city and county, city, town, village, school district, or recreational district may receive funds from any private or public source for the purpose of constructing and operating such television transmission and relay booster facilities.
>
> "Section 5, (Tax limitations not to apply.)
>
> Any tax levy for the purpose of this act shall not be within the limitations prescribed for any county, city, city and county, town, village, or county, or school district, or recreational district."

The inference, plainly, is that there is a planned future use of television channels for education in Colorado. The inference is further substantiated by the very effective school and community operation of Channel 6, in Denver. This potential demand for educational channels must be given prime consideration.

Basing the projection on the general information received in the survey, and on an examination of the state's special problems and its potential need for translators in remote valley regions, there will be need within the next 10 years for at least sixteen additional channels to serve the educational requirements of Colorado.

CONNECTICUT

Connecticut, one of our smaller states, is densely populated. It has 26 four-year colleges and universities and three two-year colleges, with a combined enrollment of approximately 49,000. Connecticut schools, well distributed throughout the state, have a total enrollment of approximately 437,000.

The Connecticut State Department of Education says:

> "As population increases and the complexity of subject matter increases there will be more need for effective, authoritative, and updated instruction. Broadcast television can make this great contribution in meeting this need. The present reservations can in no way meet the impending needs of education. Large population centers, in fact, may well make excellent use of several broadcast sources.
>
> "The Connecticut Educational Television Corporation plans to broadcast in the near future. In addition, several cities are conducting feasibility studies in the use of broadcast television in connection with the Connecticut Educational Television Corporation's plans."

The Connecticut Educational Television Corporation is a non-profit corporation, composed of colleges, school systems, and interested citizens of Connecticut. The Corporation announced in the spring of 1961 that Trinity College in Hartford had agreed to provide space on its campus for the facilities of the Corporation.

In a working agreement approved by the respective trustees of the Corporation and Trinity College, the college will provide office and studio space and will have representation on the Corporation's executive board.

Ben A. Hudelson, general manager, said the Corporation hopes to begin broadcasting in the fall of 1961, on Channel 24 in Hartford. This is one of the three channels now reserved for education in Connecticut.

Present program plans are to provide in-school instruction in the elementary and secondary schools, and in-service training for teachers; college level courses in cooperation with the constituent members; and, at other times, general education and cultural programming for community purposes.

All colleges, universities, and school systems in Connecticut responding to the survey (except Yale University) indicated that they are planning to cooperate with the Connecticut Educational Television Corporation in the use of broadcast television. If their cooperative efforts are successful and meet the observed and potential needs, Connecticut, on the basis of minimum scheduling, will require at least six channels in addition to those now reserved in the state.

DELAWARE

Delaware is one of our smaller states, both in area and in population. In many circumstances it has the peculiar problem of having to depend to some degree upon its neighbors for the development of such facilities as instructional broadcasting. As an example, Dr. George R. Miller, Jr., of the State Department of Education, says that Delaware is considering cooperating with Philadelphia in that city's efforts to acquire Channel 12, now designated at Wilmington.

Dr. Ward I. Miller, Superintendent of Wilmington Public Schools, says: "We believe that television has unlimited potential in sound education. As soon as possible we hope to make use of it in the Wilmington schools."

Dr. John A. Perkins, President of the University of Delaware, says the university is willing to carry its share in any cooperative arrangement that may be developed in the state.

Dr. Wilmer E. Shue, Superintendent of Schools in the Newark School District, says: "Television looks to me to be a must in the future in order to provide quality education for the tremendous numbers of children that the schools will have to provide for in the 70's."

These Delaware educational authorities reflect an attitude of eagerness and desire which is restrained by the geographical conditions of the state.

Delaware has two four-year and two two-year colleges with a combined enrollment of approximately 6, 500, and has approximately 72, 000 students in its public schools. If the minimum degree of the projected use of instructional television is attained in Delaware, at least two additional channels for projection into the southern-central and southern sections of the state will be needed to complete the educational system. This projection takes into account the sharing of such long range facilities as may be made available from Philadelphia or Wilmington.

FLORIDA

Florida has been experiencing one of the largest rates of population increase in the United States. The consequent impact on its total educational system has strained the resources of the state. In planning to meet the continuing growth of enrollment in schools at all levels, television has been considered an important adjunct to the educational system.

In 1957 the Florida State Legislature passed a law creating the Florida Educational Television Commission. The act sought to provide through educational television a means of extending the powers of teaching in public education and to raise state educational and living standards. The act directs this Commission to establish a television network connecting such communities or stations as may be designated by the State Board of Education. Under the act such networks are to be utilized primarily for the instruction of students at existing colleges and universities, including community or junior colleges of the state.

To meet the impact on higher education that has been increasing each year - and which bids fair to increase during the next decade - Florida has established a long range plan designed to provide community junior college service for all people in the state. It was originally planned to establish in order of need, in the various communities, between 35 and 40 junior colleges. Of these, 24, well distributed about the state and meeting the needs of the more concentrated areas of population, have already been established and are in operation. In 1961 the legislature paved the way for the establishment of additional junior colleges to bring the plans up to the original quota.

Because use of television instruction figured largely in the planning of this system of junior colleges, the Florida Educational Television Commission has asked the Federal Communications Commission to reserve an additional sixteen channels in the state. Florida originally had five VHF channels and four UHF channels reserved for education. The five VHF channels in the major areas of population and at the state universities have now been activated and are serving the school systems, colleges, and universities in the state.

The four UHF channels originally reserved were obviously inadequate to meet the demonstrated additional needs in Florida, so the Florida Educational Television Commission had its engineers plot sixteen additional channels which could be dropped into Florida or reserved from the general table of assignments. Granting of these sixteen additional reservations by the Federal Communications Commission will provide Florida with a total of 25 channels to be activated in the general system of public education in the next ten years.

But this will not in itself be sufficient. The southeastern part of the state - Dade County - has already applied for an additional UHF channel and has told this survey that it will probably need during the next ten years at least three more channels.

The response of the communities and the school systems throughout Florida, coupled with the official actions of the State Department of Education, State Board of Higher Education, and the State Educational Television Commission, indicates that projected plans will require an additional 14 channels beyond the number originally requested by the Florida Educational Television Commission in its petition to the Federal Communications Commission. This would mean a total of 39 channels (34 in addition to the five now on the air) would have to be reserved for Florida to meet its projected needs.

Superintendent Thomas D. Bailey, of the State Department of Education, appointed a committee to recommend to the 1961 Florida legislature ways in which the state can make educational television an everyday part of the school program in most areas. He says: "We plan to expand these facilities as rapidly as possible."

Florida, the tenth largest state, has a population of almost 5 million. It has two of the nation's 38 large standard metropolitan areas of over 650, 000 population - one in southeast Florida and one on the west coast. It has sixteen 4-year colleges and universities in addition to the junior college system, and it has two four-year state universities now in the planning stage.

The Florida school system is composed of 67 county-unit systems that include all the urban areas within the county. Total public school enrollment is approximately 1, 000, 000. In fifteen areas of the state continguous clusters of these county-urban systems are composed of large bodies of polulation ranging from 100, 000 to over 1, 000, 000. All of these areas, as has the rest of the state, have maintained their rate of growth. Authorities expect the impact on the public school system and on the system of higher education will more than double by 1970.

GEORGIA

Georgia, with a population of almost 4 million, has six large metropolitan areas. Largest is the Atlanta area, with a population of well over 1, 000, 000.

There are 47 junior and senior institutions of higher learning in Georgia, with a combined enrollment of 47,000. Heads of these institutions project an increase in this enrollment to 82,000 by 1970.

Georgia has 198 school districts, with an enrollment of nearly 1,000,000. The largest districts are clustered in the Atlanta area. This area has its own educational television station on the air, and provides instructional television to all Atlanta schools and those in immediately surrounding counties daily. The University of Georgia at Athens has its own station on the air, serving both the university and the large division of continuing education.

Over half the Georgia school population is in small towns or rural districts and in many instances television instructional services are more needed there than in the larger metropolitan areas.

The State Department of Education is now constructing production studios in Atlanta. It has applied for construction permits and has received them for two stations for instructional services - one in Waycross and one in Savannah. It anticipates the addition of another major channel for the northern part of the state, to be located on Mount Oglethorpe.

This will give the Georgia state educational system three major outlets with VHF channels to provide for its small towns and rural systems.

In March 1961 the State Board of Education voted to go into partnership with the Muscogee County School Board to build a tower in western Georgia to serve the metropolitan area of Columbus and rural and surrounding areas. This will be a UHF channel already assigned to Columbus. When erected, it will serve an area having more than 300,000 population.

The report of the local Education Commission of Atlanta and Fulton County on increased excellence and efficiency in the 1960's says:

> "Approaches spelled out in this program require major changes in the instructional and learning processes and in the administration of the Atlanta and Fulton County systems. Implementing these recommendations will necessitate requiring a new perception of how students, teachers, and administrators go about their respective roles in achieving educational excellence. The research and development program under the guidance of the MEC will test and prove the best ways of using the educational means herein recommended. Currently the career development program will have to assist teachers and administrators in developing a comparatively new professional environment. Obviously no price tag can be put on the research and development required. To begin with it would seem prudent to expect that for at least one percent of the annual operating budget of the two school systems, or about $350,000 to be the annual rate of expenditure. The Metropolitan Education Commission

> when established should be asked to draw up a budget for research and development sufficient to sustain the broad scale of action contemplated. This should be viewed as money to create the shape of the future for the Atlanta and Fulton County systems. The suggested program is not a blueprint to be put into action; rather it is a set of plans and policies set forth in the proceedings sections of this report. The exact form that these might take at a given time will and should change as the realities around the schools change.
>
> "The means for setting directions, scientifically testing these means for their movement toward these directions, and providing the highest professional growth for instructional and administrative staffs in the competence to use the means proved in the research and development activities -- these will be the mission of the Metropolitan Education Commission with this research and development program.
>
> "In summary, the Commission projects a capital item for television of $3, 925, 000 and a yearly operational charge of $900, 000 for television and $350, 000 for the development program annually. The two boards of education would probably be wise to view the capital cost of the television phase as new money to be spent by them. Over a ten-year period the cost of television is negligible, compared with other expenditures in the two systems. As other counties come into the Metropolitan Educational Commission, both capital and operation expense will be proportionately reduced."

Under this plan the Atlanta metropolitan system will require several more channels than it now has available.

The State Board of Education has established a program to provide in-school educational television service intended eventually to reach every classroom in Georgia. This program is predicted on the development of a state-wide television network. Planned development of state-wide coverage is based on use of all existing facilities in Atlanta and Athens and provision of the channels already mentioned. An initial $500, 000 has been set aside to construct the first new school production center in Atlanta.

Reports from the schools of higher education and from school systems throughout Georgia; the attitude of the school superintendents; and the plans of the State Department of Education indicate that more than one channel outlet will have to be provided if Georgia is to achieve the educational excellence and curriculum improvement intended. These plans, plus a study of the distribution of Georgia's general population and its student population and reference to the engineering report, evidence a need in Georgia for at least 18 additional channels.

HAWAII

Hawaii's Deputy Superintendent of the State Department of Public Instruction, Dr. William H. Durr, writes:

> "The use of television for direct classroom instruction in science, foreign languages, mathematics, and other subject areas; the use for adult instruction in language, basic reading, and cultural subjects; and the use of television for in-service education of teachers, are the instructional needs which could be satisfied or improved by the use of broadcast television. It is expected that with increasing enrollments and with general population increases as more people move to the Islands, the needs which television can help to meet will increase."

A study of the needs for educational television and potential program services is now being conducted in Hawaii. A survey representative has met with the Board of Commissioners, the Department of Public Instruction, the Joint Education Committees of the State Legislature, the Governor, and with various members of the Department of Public Instruction staff. At this writing no action has been taken but it is expected that activation of the four reserved channels in the Islands will be recommended. The channel in Honolulu is to serve as the prime station, and the three other channels on the other islands to act as satellite stations to carry the programs over as much of the entire state as possible.

While some of Hawaii's problems are peculiar to itself, it has problems in education in proportion to those of other states. Many areas are in need of improvements, some areas of the curriculum are deficient and could be improved or satisfied by the use of broadcast television. There is an especial need for outlets for general adult instruction as well as for total community programming.

Development of facilities for educational television has progressed slowly, but the need for facilities is evidenced in the attitude of educators who must cope with the problem of increasing population and other evident needs. Study of the population distribution in Hawaii, and of the student population separately, coupled with an engineering projection, indicates Hawaii will in the future need more than the four channels now assigned it for education.

IDAHO

Idaho has two channels reserved for education - one in Boise and one in Moscow. Both these localities are in the extreme western part of the state. As it happens, a substantial portion of the population lives in the eastern part of the state where there are no reservations for education. Idaho Falls, Pocatello, and Twin Falls have indicated an interest in developing educational television. This is especially true of the Idaho State College at Pocatello.

Dr. Donald E. Walker, President of the Idaho State College, says:

"We are a growing liberal arts institution with an enrollment of approximately 2,700 students. During the past decade, enrollment, along with increasingly high academic standards, has grown rapidly. Even modest predictions spell at least this much growth in the next ten years. Geographically we are located in a position to serve the educational television needs of the Snake River Valley, the largest area of population in Idaho."

And R. D. F. Engelking, State Superintendent of Public Instruction, reports:

"The State Department of Education in Idaho feels that television will play a very important future role in our educational system. Idaho is a long state, with rough terrain. Under present conditions the two channels of television reserved for Idaho will not cover all parts of the state. A third channel to serve the eastern part of our state would also be required to get educational information to all parts of the state.

"We certainly feel that the Federal Communications Commission should seriously consider the demands made upon it and set aside adequate facilities for our future education. If television has any use at all, we should reserve a minimum of channels for our state. We have had a steady increase of student enrollment for the past twelve years. Our state is young, with a lot of natural resources and the opportunity to expand and grow. We are aware that television is quite new and many of the uses that might be made of it are not yet developed. At Idaho State College in the southern part of our state we are developing a television-communications system. The University of Idaho, in the northern part of our state, is also working on a similar program. If these programs develop and grow, much useful information will be available, not only to the public schools in the state of Idaho, but to our adult population as well.

"I suggest that a very careful study be made of the use of educational television for our future generation. We in the State Department of Education in Idaho will be ready to aid in any way we can in relation to the educational use of television and the necessary channels to promote it for us."

Dr. H. Walter Steffens, Executive Dean of the University of Idaho, says:

"At present there are over 4,000 resident students at the University of Idaho. We serve more than that number through our adult education division. We have six agricultural experiment stations throughout the state, and have county agents in 42 of the 44 counties. We are a land-grant university with state-wide responsibilities. The University of the state has obligations, through television, to take its services to all regions of the state; and in making plans for the future it seems that the southeastern, the central, and the northern parts of the state must be remembered, in reserving channels for this use. In planning for the future we must prepare for approximately

> 6,000 students on the campus, about 8,000 students off campus, and several thousand of other adults through our other facilities, including television programs."

Idaho has four fairly large centers with over 50,000 population, all of which are located in the southern part of the state. It has six four-year colleges and universities with a total enrollment of approximately 8,000, and two two-year colleges with a total enrollment of almost 3,000. There is a public school enrollment of approximately 175,000. Many of these students are enrolled in rural schools or very small districts. If the state universities and the scattered schools are to be served, and the future television needs of Idaho to be protected, then it is evident that several more channels must be made available for educational purposes. A projection of future needs indicates that a minimum of nine additional channels will be required.

ILLINOIS

Illinois is a populous state with a large educational system. It has 79 four-year colleges and universities and nine two-year colleges, with a combined enrollment of approximately 186,000. The public school enrollment is in excess of 1,660,000.

There are fifteen large population centers outside the metropolitan area of Chicago. These are well distributed through the north and central parts of the state.

Illinois has three VHF and five UHF channels reserved for education. Two of the channels are activated - one in Chicago serving the community and the public schools, and the other in Urbana, serving the state university and surrounding communities. The third VHF channel, at the Southern Illinois University, is expected to go on the air in 1961. This will leave five UHF channels scattered throughout the state. None of these channels is compatible with the major receiving facilities of the community to which it is assigned.

Dr. George T. Wilkins, Superintendent of Public Instruction for Illinois, says:

> "Educational television has the potential for contributing to every area of the curriculum. Specifically, in-service teacher-training, supplementary to personal instruction, presentation of required courses to stimulate greater coverage and achievement, pre-planned systematic instruction, and general enrichment. Invariably a society adds to a field of knowledge and looses its bounds upon certain mores. Mass communication, especially educational television, can contribute greatly to organize, clarify, and summarize behavioral patterns, and the great mass of knowledge. We anticipate more and better use of educational television. As television is better accepted, and used with greater efficiency, it will probably become a state-wide educational medium. At the present time, Southern Illinois University in Carbondale is planning to activate educational television beginning in September 1961. There is a high interest in educational television from both the school personnel at

the receiving end, and the communities and universities at the operating end. An advisory committee at the office of the Superintendent is being formed to study educational television and its related problems."

Dr. Phillip Lewis, Director of Instructional Materials for the Chicago Board of Education, says: "To be effective in an optimum manner it will be necessary to provide a number of channels in a single service area."

Dr. Benjamin Willis, General Superintendent of Schools in Chicago, says: "Many more uses could be made with more broadcast channels. The Chicago area needs as many as six channels for school use of broadcast television in the years ahead."

The school systems and colleges of Illinois surveyed indicate a willingness to cooperate in the use of educational television channels. In the matter of channel allocations, educators' assessment of future needs consistently reflects an intense need for multiple channels. In this state, also, the Midwest Project on Airborne Television Instruction is an activity of considerable interest. In Illinois there are several "resource institutions" and "demonstration schools" for MPATI. But survey personnel did not find among educational institutions there the same degree of hopeful dependency on MPATI as they discovered in neighboring states.

Two plans have been advanced for primary network of educational television in Illinois. One, assuming that Channel 8 in southern Illinois goes on the air in 1961, would simply link the present three big stations in Illinois and add two or three high-powered stations. The other calls for use of the prime VHF stations that are in a line from southern Illinois to Chicago, linked with the educational stations in St. Louis, and supported in the various localities by low-power UHF stations. This would call for a primary coverage with at least fifteen channels in the state.

Studying the collective assessment by Illinois educators of future needs of educational television in terms of school schedules, varying levels of education, and multiple channel, a reasonable projection is that between 20 and 27 additional channels will have to be made available if the future of television services there is to be protected.

INDIANA

There are 41 colleges and universities with a total enrollment of 88,000 in Indiana. Public school enrollment is approximately 950,000. There are five large centers of population in the state, and seven small centers of population in excess of 50,000. The population is scattered fairly evenly over the state.

There are nine channels in Indiana reserved for education. None of these has been activated, although it is expected that within the next two years Channel 9 in Evansville will be put on the air, and Channel 30 at the University of Indiana in

Bloomington. Channel 47 at Purdue University in Lafayette has not been activated. The Purdue facilities and interest for some time have been involved with the experimental Midwest Project on Airborne Television Instruction. *

Indiana reports much interest but little activity in broadcast television. Most of the major educational institutions there are involved in the experimental Airborne Project, either as "coordinating centers," as "demonstration schools," as "resource institutions," or, in some cases, as all three.

There is little talk of a state network in Indiana. The development of channels and facilities to provide for local regional needs is more immediately important in the thinking of most educators and lay boards than is the development of a state network.

The school districts surveyed reflect a great hopefulness and future dependency on the experimental Airborne project. To what extent this hopefulness and dependency will continue to color the process of activating the reserved channels is difficult to anticipate.

Dr. William E. Wilson, State Superintendent of Public Instruction, says:

> "I believe the general field of instruction can be greatly improved by the use of television. These needs will increase greatly during the next decade because of the expanding number of school children and the continuing scarcity of well-prepared teachers. I am sure that there will be a great expansion in the use of television in school instruction in this state during the next few years. I feel the reservation of proper channels is necessary in order to provide adequate television service for the schools of our state."

Aside from Dr. Wilson and a scattering of college administrators, little understanding was evidenced in Indiana of a need for multiple channels in the future, with the exception of the proposed experimental project of Airborne Television. Survey responses nourished opinion almost to the similitude of inference that because of concern with this experiment not too much thought has been given to the implementation of ground-based facilities. But responses from Evansville, Bloomington, South Bend, and from the State Department of Education indicate that if television is used at all in the future in Indiana from locally operated stations - and there is evidence that some will be - then certainly more channels will be needed to provide this service. How many more is speculative. An engineering projection of need, if ground-based facilities were developed, is that at least 10 more reserved channels would be required.

IOWA

There are 31 four-year colleges and universities in Iowa with a total enrollment of approximately 35,000, and 17 two-year colleges with a total enrollment of approximately 5,000. Iowa's public schools, well distributed, have a total enrollment

* See Appendix.

of approximately 575,000. There are three large centers of population in excess of 100,000 and eight small centers of population in excess of 50,000. Iowa has six channels reserved for education. One channel has been activated, in Des Moines. Considerable interest has been evidenced in the development of other channels for education throughout the state.

David A. Dancer, Secretary of the Iowa Board of Regents, writes:

> "The Iowa Joint Committee on Educational Television is a voluntary organization established ten years ago. Its membership includes representatives of the State Board of Regents, State Department of Public Instruction, and the Des Moines Public School System. The Committee as a whole and its individual constituent members have sponsored some outstanding educational television programs in our state. We feel that there is an increasing recognition of educational television's potential, and are aware of the demands in many areas of Iowa for additional service to the schools, and to the adult population. We are convinced that the present allocation of educational television channels for Iowa are inadequate to serve the state as it should be served. We know that there is a need for additional channels, and for more financial support than is available at the present time."

Forest J. Moore, Chairman of the Iowa Joint Committee on Educational Television and representing the State Department of Education, writes:

> "I am enclosing a resolution affecting the legal status of educational television in the state of Iowa which was passed by the House of Representatives with the concurrent action of the Senate on April 28, 1961. This resolution serves to document the needs for educational television spectrum space in the State of Iowa. It is evident by this legalizing action of our State Legislature television channels should be reserved for this state to provide facilities to serve the total educational needs of our population.
>
> "HOUSE CONCURRENT RESOLUTION 15 April 28, 1961
>
> State of Iowa
>
> "Whereas, the General Assembly of the State of Iowa recognizes the increasing need for additional resources and the need of sharing those resources so that educational benefits may be provided to all the people of the State of Iowa; therefore,
>
> "Be it resolved by the House of Representatives, the Senate concurring, that the continued use of educational television and radio broadcasting should be encouraged and, to the end that increased educational opportunities may be so made available. The use of such media should be expanded as rapidly and as fully as possible; and

> "Be it further resolved that it is desirable that educational opportunity at all levels be extended to all the people of Iowa, the General Assembly of the State of Iowa hereby declares its interest in, and intent to undertake a study of the means by which additional educational facilities may be employed to serve the educational needs of the State of Iowa; and
>
> "Be it further resolved that the education resources so richly prevalent in the entire upper midwest should be made available to the people and to the schools of Iowa by means of the proposed Upper Midwest Six-State Educational Television Network; and
>
> "Be it further resolved, that the General Assembly of the State of Iowa pledges its support in the planning of an educational television network which will adequately serve the State of Iowa and in cooperation with the proposed Upper Midwest Six-State Educational Television Network."

In addition to the reserved channels and the educational station operating in Des Moines, there is WOI-TV, owned and operated by the Iowa State University at Ames as a commercial station, but with programming that is predominantly educational. WOI-TV greatly assists the present educational station both in originating and in recording programs that would be difficult and probably impossible without the facilities at the state university. It also produces programs for school and adult education that are distributed throughout the state. The Iowa State University and the State Board of Education now are planning to use the state university facilities in future instructional programs for in-school use.

While the State University at Iowa City and State College at Cedar Rapids have not yet activated a station, both are involved in production and planning for the future. Understanding of the value and use of television for instructional purposes at all levels is well developed in all areas of education in the state.

Reports from the various educational institutions in Iowa indicate that there will soon be a considerable development in the use of broadcast facilities. The action of the state legislature in its last session approving both a state network and a tie-in with the Upper Midwest Network will spur such development.

It is difficult to anticipate the kind of multiple channel needs that will be evident in Iowa in the next few years. But, on the basis of present planning from the center of the state in the Ames-Des Moines area, in the northeastern part of the state, in the Waterloo and Cedar Rapids areas, and possible development in the western part of the state in the area of Sioux City, there should be a minimum need within the next ten years for at least ten additional television channels.

This is supported by the survey of the individual school systems in the state. Fourteen individual school systems reported they are now using instructional television in the classroom and are planning to continue and extend such use. Six systems reported they are planning to use it. These programs are developed mostly through the state university. But, if this kind of experience continues, it could be a basis for continued expansion of educational television facilities in Iowa.

KANSAS

A report by the Kansas State Legislative Council in 1960 on the needs of educational facilities in Kansas stated, in part:

> "There are approximately 2,800 school districts in Kansas. Over 1,900 of these districts operate nothing but elementary schools.
>
> There are over 900 one-room schools in the state. Of the 557 high schools in Kansas, 427 have enrollments of less than 150, and over half of these have no more than 60 students - and many less than half of that. It is obviously impossible to organize an adequate modern curriculum with such restricted resources as must obtain in such small, isolated school units. To attempt to do so would be impractical and impossibly expensive. Yet every school administrator in Kansas recognizes the great number of educational needs which are not now being served, and which cannot be adequately served in the foreseeable future, unless some economical means of universal assistance can be provided in the neglected areas of a curriculum which must be designed to meet the needs of children and adults in the present world.
>
> "Without exception, the school administrators, board members, and teachers with whom this problem was discussed agreed that educational television, well organized and properly used, would strengthen the total curricula of the state, and in a large measure provide those educational needs not now being served adequately by the multiplicity of small schools."

Dr. Forrest Whan, of the Kansas State Teachers Association, representing that body before the Congressional Committee on Interstate and Foreign Commerce, said, in part:

> "The teachers of elementary, secondary, and higher education in Kansas are in a position to know of the desperate need for educational television in the state, and the crippling effect the loss of this medium of instruction would have on education in the state in future years... We not only strongly urge - we plead with - the Congress of the United States to see to it that adequate channels for state-wide educational television be reserved for Kansas indefinitely - regardless of how long it takes - so that whatever problems face this state in implementing educational television may be solved, and the channels put to this great use."

The University of Kansas at Lawrence, the Kansas State University at Manhattan, the University of Wichita at Wichita, and all of the Kansas state colleges have been concerned with the development and use of educational television and television for instructional purposes. Limited budgets and various state handicaps have delayed development of the broadcast channels.

However, the State Legislative Council, in its 1960 report to the legislature, presented a plan for a Kansas State Network designed as a basic service for the colleges and schools of the entire state. The minimum plan proposed would use five VHF channels with 1,000-feet high antenna at maximum power and one UHF channel using 1,000-feet high antenna at maximum power. These six channels would be distributed at approximately equal distances across the top and bottom of the state.

Dr. William J. McKeefery, President of Washburn University in Topeka, writes:

> "With the rapidly expanding spectrum of knowledge, it becomes increasingly important that education use the best tools possible to accomplish its objectives in reasonable time and at moderate costs. Educational television holds considerable promise of extending the efforts of the best teachers in a wide variety of special topics to a greater number than ever before. We believe in America in educational opportunities for all who can profit from them. This means reaching people where they are and at the times they are available. Television in the home, and in the public schools can do a flexible job through sufficient stations and channels. A nation that has entered the Space Age certainly should use one of the important space media for its educational program."

Educators in Kansas, the Legislative Council, and the legislature itself have recognized the need for using television for instructional purposes. Their plans, and their concern with such use in the future, are indicative of the number of channels that will eventually be needed in Kansas. If the proposed six-channel network, or any reasonable variation of it, is put into operation, this network will have to be double-channeled very shortly to provide the multiple schedules necessary at the various levels of education. The number of channels requested in the proposed plan would have to be doubled and redoubled by the 1970's if education were to be adequately served. In simple projection this means that a minimum of sixteen additional channels is needed in Kansas.

KENTUCKY

Kentucky is a state with many, and unique, problems in education. In terms of population, it is one of the slower growing states. It had an aggregate increase from 1950 to 1960 of only 2.5%. There was an increase in the school census of approximately 3%. But this affected only the larger and more industrialized areas; 84 counties lost more than 1% of population during the last decade. An apparent correlation has been found between the loss of population in rural and mountainous areas and the quality of education that can be offered.

In one county, which lost over 25% of its population in the 1950-1960 period, the schools were subjected to intensive study. One discovery was that, on the basis of mental-ability tests, students there were significantly low in ability to do school work successfully. Another study obtained similar findings in a county which had lost approximately 17% of population in the last decade.

Reports of the Legislative Research Commission in Kentucky show that the rural schools, particularly, need educational facilities and opportunities not now available. The Commission has intensively studied the situation and believes that educational television could help remove some of the limitations now found in the small Kentucky high schools, and in the elementary schools.

A survey report of the Kentucky Legislative Research Commission was supported by a resolution passed during its 1960 session which, because of its pertinence and brevity, is here quoted in full:

> "Whereas, the education of the citizens of this Commonwealth is one of the largest problems before the General Assembly; and
>
> "Whereas, the use of educational television holds promise of solving a portion of the educational problems of Kentucky;
>
> "Now, therefore,
>
> "Be it resolved by the General Assembly of the Commonwealth of Kentucky:
>
> 1. That the Legislative Research Commission be, and hereby is authorized and directed to conduct a full study of the use of educational television in the Commonwealth,
>
> 2. That the Department of Education, the University of Kentucky, and such other state agencies as the Legislative Research Commission may designate, are directed to cooperate to the fullest extent with the Legislative Research Commission."

Following this action, the Legislative Research Commission appointed an advisory committee on educational television, composed of educational, legislative, and civic leaders. After studying the report on educational needs, and after consultation with local engineers and with engineers from the National Association of Educational Broadcasters and the Joint Council on Educational Broadcasting, the advisory committee recommended that a state-wide educational television network be established to "enrich and upgrade the quality of education in Kentucky public schools."

A technical and organizational plan for the establishment of such a network was approved by the Research Commission of the University of Kentucky, the State Department of Education, and other state agencies. The Governor then formally requested the Federal Communications Commission to allocate and reserve 10 specific channels to Kentucky for educational purposes. In his statement to the FCC the Governor said:

> "The January 1962 regular session of the Kentucky General Assembly will be asked to approve an enabling act for a state-wide educational television network and to appropriate funds for its construction and operation."

Kentucky has 19 four-year colleges and universities and three important two-year colleges with a combined enrollment of approximately 36,000. The more than 600,000 pupils enrolled in the public school system are fairly evenly distributed in small towns and rural areas throughout the state.

There are three centers of population in Kentucky in excess of 100,000. All are located in the north-central part of the state, forming a large triangle from Lexington to Louisville to Covington. There are ten small centers in the state with more than 50,000 population. These are distributed in the extreme eastern and extreme western parts of the state.

There is at this writing only one educational television reservation in Kentucky. This is Channel 15, in Louisville, an active station that services not only the school systems of north-central Kentucky, but also participating school systems in Indiana. In Kentucky six county and district school systems participate with the Louisville school system, and in Indiana there are six participating school systems on the secondary level. Through this cooperative effort more than 100,000 children have received instruction by television from the Louisville educational television station. There is evidence that additional channels will be needed to serve this particular area as more educational institutions come into the picture, as more grade levels are served, and as more areas of the curriculum are taught by television.

In its report on the proposed plan for educational television in Kentucky the Research Commission said:

> "Because of the normal six-hour length of the school day, a maximum of 12 thirty-minute in-school telecasts per day is possible. This amounts to one per grade level for the public schools. If educational television is to have maximum impact on educational quality, an hour per day probably should be available for students in the fourth through the twelfth grades. This would require nine hours of programming or 50 per cent more than are available from a single channel. Twenty-minute daily programs for the three primary grades would demand another hour per day, making a total of ten hours.
>
> "To provide ten hours of telecasting per school day would require simultaneous use of two broadcast channels covering a specified area."

Dr. Wendell P. Butler, Superintendent of Public Instruction, says he believes:

> "that educational television can be used in the schools with a great deal of effect and that the increasing needs will force the need and use of television in the years ahead; and that additional television channels should be reserved for the use of education in sufficient numbers to provide for the evident needs of the future."

The attitude and action of the legislature, the studies and reports of the Legislative Research Commission, the activities of the University of Kentucky and its collateral institutions, and the attitude indicated by the State Department of Education demonstrate that Kentucky will develop and use educational television to improve the quality and quantity of education in the state. When this is done it is evident that - if the different levels of education, elementary, secondary, college, and general adult are to be served - there will have to be at least double channeling of the major stations. Some of these will be high-power stations, and some low-power. It is probable, from the reports, that if the ten additional stations proposed by the Legislative Research Commission are activated some of them will be low-power stations. Nonetheless, these stations are needed because of the geographical location of the communities and the terrain in which the stations will have to operate.

A projection based upon the present proposals indicates that in addition to the eleven basic channels (including the active Louisville station) now proposed, at least another eleven channels will be needed within the next ten years.

LOUISIANNA

Louisiana has 20 colleges and universities with a total enrollment of approximately 54,000, and a public school system which has an enrollment of approximately 660,000. It has six large centers of population in excess of 100,000 and seven small centers in excess of 50,000.

Louisiana has four educational television channels reserved. Two of these – one in New Orleans and one in Monroe - have been activated. The station in New Orleans on Channel 8 is owned and operated by a non-profit community foundation, but serves the New Orleans schools and adjoining parishes. The station on Channel 13 in Monroe is owned and operated by the State Department of Education.

According to Dr. J. B. Gremillion, Director of Research and Statistics for the State Department of Education, the Department believes that as more and better instructional programs are developed, more people in sections of the state not now being served by educational television channels will demand these services. He says plans are now being developed for extension of present facilities and for activating the rest of the reserved channels. He says also that additional channels are needed in the central, southern, and eastern portions of the state.

The State Department of Education maintains that educational television is the only practical means for reaching the masses with instruction for pre-school, elementary, secondary, college, and adult age groups.

Dr. Harvey Gardiner is Assistant Superintendent of St. Landry Parish Schools, which is one of the larger systems in the state and has an enrollment of some 24,000. He says:

> "We can visualize a situation where supervisors and master teachers working and planning with groups of teachers in subject-matter areas could outline the instructional program whereby the individual classroom work would be supplemented by weekly or biweekly television lectures or demonstrations, by experts who would have the time to prepare presentations more thoroughly. The individual teacher would introduce the topic and set the background and develop interest. Following the televised program the individual teacher would elaborate on the topic, and make necessary adjustments to take care of individual differences, and check the learning that has occurred. To allow this great facility of educational television to go unused in our schools would indeed be a great mistake."

Miss Edna Mae Strobel, Coordinator of Education by Television in the New Orleans Public Schools, says, and Dr. James P. Redman, Superintendent, concurs:

> "At present the entire educational television air-time for in-school broadcasting is available to the New Orleans Public Schools; however, as peripheral parishes develop their programs, portions of this time will be given to them. When this situation arises, it will be necessary either to decrease the present offerings or to acquire another channel."

Dr. Harold H. Gauthe, Supervisor of Instruction in the Lafayette Parish School System, says:

> "We certainly are of the opinion that television has its place in the instructional program and we plan to make use of it when an educational television station is established in this area "

Evidence found in the survey of the schools is that the parishes (counties) are waiting only for the lead of the state to provide them with the facilities to use educational television. The State Department of Education indicates that this provision is planned. No official statement was made, but there is an apparent implication that the development depends upon provision of funds by the state legislature or upon procurement of capital investment funds from other than state sources.

With the two activated channels, one in the extreme southeastern part of the state and the other in the extreme northern part of the state, now being used for instructional purposes and program production for various levels of education, activation of the other two reserved channels in the foreseeable future is anticipated. As the State Department of Education indicates, the area in the northwestern part of the state around Shreveport and in the central part of the state around Alexandria will also have to be provided with channels if Louisiana is to be properly served. If this comes about and the development anticipated by the State Department of Education is accomplished, this initial service will have to be doubled within the next decade. In such areas as Baton Rouge, New Orleans, and Shreveport more than two channels may be necessary to provide the scheduling on the various levels of education. The least that can be expected, on the evidence, will be a doubling of the basic system. This would mean four more channels added to the presently reserved group for the basic service, and 12 additional channels for the multi-channel schedule needed to serve all of Louisiana's instructional and community needs.

MAINE

Maine has two major propulation centers in excess of 100, 000. The rest of the state is composed of large areas of sparsely populated country or small town and rural communities. Its eighteen colleges and universities, most of them located in the southern half of the state, have a total enrollment of approximately 14, 000. Public school enrollment is approximately 200, 000.

There are now five channels reserved for education in Maine. This includes the addition of the two channels during this past year by the Federal Communications Commission. A report on education and television was issued in 1960 by the University of Maine in cooperation with the State Department of Education. Among other things, the report said:

> "Maine is a rural state. In this modern day, 44% of the land area of the state is still unorganized territory without municipal government, and scattered through this unorganized territory are 1, 600 school children who do not have the benefits of school district organization. Both children and parents look to the State Department of Education for help. But distances are great and travel inefficient. Television can reach these unorganized territories. Television can assist in coordinating the educational program. Television can improve the instruction. Maine's 492 organized communities operate many small schools; 34 communities are too small to maintain schools; 139 communities have a total school population of less than 100. The quality of instruction ranges from good to poor. Television instruction can upgrade local effort without the loss of local control. There are 1, 022 elementary schools in Maine, yet only 35 of the 458 communities operating public schools have a formal art program, and only 207 a formal music program. Educational television can enrich the curriculum of these small schools. Educational television can bring science, Maine history, art, and modern language in these schools. Economically and practically educational television can bring to these schools certain courses which otherwise would be almost totally unavailable. 121 out of 178 public secondary schools, and 54 of 62 private

> schools, have fewer than 300 students. Only 29 of these Maine high schools and academies received the accredited rating during 1960. In this age of increased opportunity, this era where knowledge is essential to survival, should not the rural student be afforded equal opportunity of his urban cousin? Can Maine squander these human resources? Educational television can act as an equalizer. Educational television can bring to sparsely settled areas many of the educational opportunities of the urban area - opportunities presently non-existent or only partially available."

An educational television system has been recommended for Maine and educators of the state are now organizing to develop such a system.

Dr. Robert L. Strider, President of Colby College, writes:

> "Colby has recently joined with our neighboring colleges, Bates and Bowdoin, in a plan to develop Channel 10, franchise for which is currently held by Bates College as an educational channel. All three colleges are prepared to spend a certain amount of unrestricted funds for this purpose. Plans are under way for the erection of a tower and transmitter, and we hope to have the station on the air by the fall of 1961. President Charles F. Phillips currently heads the Corporation being formed to manage the channel."

Dr. Philip A. Annas, Executive Director, Division of Instruction, Maine State Department of Education, says:

> "The private colleges are building an educational television station in Augusta and we are asking the legislature for funds to build a station at the University of Maine with translators in three other sections of the state."

Maine is developing educational television slowly but surely. Further evidence of progress is the participation by Maine in the developmental program of the Eastern Television Network. Representatives of the University of Maine, Bates College, and the State Department of Education have participated in organization meeting of the proposed Eastern States Television Network.

If the five presently reserved channels are activated as proposed by educational authorities, and the instructional schedules of the various levels of need are served, Maine will need to have at least five additional channels reserved for education.

MARYLAND

It is difficult to consider the needs of Maryland for educational television facilities without considering the surrounding area of the District of Columbia, and without giving some thought to Delaware. In this particular area there are four large population centers lying around and to the east of Washington, D. C. Scattered from east to west there are approximately six small population centers.

Maryland has a public school enrollment of 540,000. The District of Columbia has 115,000. Maryland has 20 four-year colleges and universities and eight two-year colleges, with a total enrollment of approximately 55,000. Maryland now has only one channel reserved for education. This is Channel 24 in Baltimore which, for a number of reasons, Maryland has been unable to activate. However, a great deal of instructional television has been used in the state.

Dr. Loyal W. Joos, Director, Department of Research and Planning, Board of Education, Baltimore County, writes:

> "We are presently using broadcast television via the three commercial stations in Baltimore. We do not have our own station as yet. We are looking forward toward the expansion of our use of commercial television stations to include actual television teaching. We now have closed-circuit in three of our schools, and several more are anticipated. One of these has been established as a laboratory experiment in cooperation with the Johns Hopkins University. Another is used primarily in teacher training. The third unit is now being installed. We believe that in the very near future, we will be able to take advantage of the new microwave bands that have been open to educational television, and begin to unify and expand within the county. Our growth in Baltimore County has been so rapid that many of our schools, both elementary and secondary, have had to be built without auditoriums. We feel that television can be used as a unifying influence and provide programs both within the individual school and throughout the community."

Dr. Orlando F. Furno, Director of its Bureau of Research, says that the Baltimore City School System is now using television through the facilities of the commerical stations there. He says they now produce three hours and more per week for in-school use and adult education, as well as some for public relations. Dr. Furno concludes: "There would be great flexibility in the use of time if we had our own station."

Since 1956 the Washington County School System has used a closed-circuit system involving six broadcast channels and a cable some 85 miles long. Production is done entirely from one center, but production facilities are available also at other points. This direct teaching program has reached some 16,500 elementary and secondary children.

Dr. William M. Brish, Washington County Superintendent of Schools, writes:

> "Because of our experience with closed-circuit television, we have learned that broadcast television would add a dimension that would be profitable. It would be to include several small elementary schools in the program which are completely out of the circuit now. It would also be possible to broadcast most of the adult education programs and perhaps the basic courses of the junior

> college program. By this means the present educational facilities in Washington County would be extended to numerous people. Furthermore, many cultural programs might be broadcast."

Dr. Brish makes this statement of observed need of broadcast facilities in Hagerstown in the light of his intimate experience for several years with this large scale six-channel operation of closed-circuit television.

To use the closed-circuit production facilities to enlarge the school program into the schools in the surrounding areas not now being served by this closed-circuit operation would require at least six channels. These channels could be low-power UHF channels, or they could be part low-power and part high-power. In any event, a minimum of six channels would be required. The same would hold true for Baltimore if it were to emulate this activity.

To provide the same type of overall direct in-school instruction by television that has been so successful, organizationally and academically in Hagerstown, Baltimore would need to have at least six channels available. This would present a problem in relation to the adjoining area of Washington, D. C., and Alexandria, Virginia, for which some sort of cooperation would need to be worked out. In any event, the evidence in the reports from Hagerstown, from Baltimore, and from the District of Columbia area shows that 15 to 18 separate channels would be required in the future to service this area properly with instructional television.

Dr. Daniel W. Zimmerman, Maryland's Assistant State Superintendent of Schools, says there are no immediate plans to provide a state-wide system of educational television. But, he says, a state-wide committee has been participating in a study of the overall need for educational television, and has set forth a positive plan of use for educational television. The State Department of Education has looked favorably upon the plan and recommended further study.

Dr. Willis H. White, Director, Division of Instruction, Maryland State Department of Education, says:

> "While Maryland does not have a state-wide plan for broadcast television, several of the local school systems do have programs and these are expanding. The channels certainly should be made available and preserved to such time as the organization and financing can be accomplished."

Discussing instructional needs in Maryland that could be satisfied or improved by use of broadcast television, Dr. White also said:

> "Education today faces responsibility that is both old and enduring, and new and perplexing. The tempo of our way of life has speeded up. We now live in a culture that is acquiring new knowledge at a tremendous pace and is applying at an ever increasing rate the discoveries of science to industry,

business, transportation, communication, and to all aspects of everyday living. As a result many new resources have quickly become a regular and accepted part of our lives. Television for education is an example of a new medium that in the course of only a few years has been accepted by the public."

All evidence reported points to the need of new and additional educational opportunities in Maryland. It shows also that educators on all levels there recognize television's potential for providing a source of additional instruction, and an improvement in instruction that cannot otherwise be obtained. There has been enough television at various levels in Maryland so that people responsible for the day-to-day processes of education have become familiar with it. With all of this, Maryland is one of a number of states which have not yet been able financially, or have not had the channel availabilities, to provide the kind of service needed.

The development in Baltimore and the general area of Baltimore is undoubtedly tied in closely with the development of Washington, D. C., and the general area of the District of Columbia and Northern Virginia. The Hagerstown expansion may be involved in the same general development processes. But it is evident that Maryland needs twelve additional channels to provide a minimum service for the area.

MASSACHUSETTS

Massachusetts is a relatively small state from which television signals would tend to spill over into surrounding states. It has 67 four-year colleges and universities and five two-year colleges with a combined enrollment of approximately 146,000. Public school enrollment is 540,000.

Massachusetts has three channels one VHF and two UHF reserved for educational television. The VHF, Channel 2 in Boston, has been one of the outstanding educational television stations, and serves a large area of educational needs in that part of the state. The other two channels have not yet been activated.

Dr. John W. Lederle, President of the University of Massachusetts, states:

"The University's new School of Education, ready for occupancy in September, 1961, will be equipped with closed-circuit television. This will be used for teacher training and the observation of kindergarten and elementary school classes in the laboratory school, which will be an integral part of the School of Education building. There are no plans for the establishment of broadcast television at the University. However, the Western Massachusetts Broadcasting Council, in cooperation with the school systems of western Massachusetts, (outside of the signal range of Channel 2 in Boston), will explore the possibility of conducting an exhaustive study and a technical survey of the engineering problems involved.

> "Like many other institutions of higher learning ours too is being subjected to certain subject matters to the imbalance of a rapidly expanding student body and limited personnel and limited facilities. Broadcast television would make it possible to bring the most brilliant and effective instructors to the campus. It would enable many faculty members to enrich their teaching with a wealth of illustrative materials, such as well-executed diagrams, working models, the most modern laboratory apparatus and photographs. Such distinctive lecturers could be used extensively for large entering classes, thus releasing faculty for more teacher-student discussion and small conference exchanges.
>
> "Broadcast television, if made available would certainly make it possible to experiment with new approaches to instruction to meet the future needs caused by increased enrollment and facilities shortage. We strongly recommend that the Federal Communications Commission reserve television channel space to serve at some future date our institution and the three private colleges in the area."

The Western Massachusetts Broadcasting Council (which comprises Amherst, Mount Holyoke, Smith College, and the University of Massachusetts) favors the reservation of television channels necessary to serve the institutions of higher learning, and the public and private schools as well. Vincent C. Brann, Program Coordinator of the Radio Station at Smith College in Northampton, which is jointly sponsored by the W. M. B. C., said:

> "Speaking for Smith College, I would hazard a guess that any educational television in the Connecticut Valley area will be, when and if it comes, a four-college cooperative venture, similar to this FM Radio Project."

Dr. Frederick A. Meir, President of the Massachusetts State College at Salem, writes:

> "We are not now using closed-circuit television. However, with the erection of a new building which is now on the board, we shall have a closed-circuit setup for the use of different departments of the college. We receive educational broadcasts from Channel 2 in Boston which are used mainly in the Horace Mann Training School connected with the College. It is possible, with increasing number of elementary school teachers being trained in public schools, that educational broadcast facilities might be needed to keep them alerted to the features of the training process which they should observe. Certainly experienced teachers now should be contacted for in-service education. This use of broadcast television is begging for strong application. Salem State College could be a center for these broadcast programs."

Four colleges in Massachusetts told survey consultants that they are now using broadcast television. Two said they are planning to use it. Sixteen colleges and universities recognized a future need for it.

Dr. William F. Young, Jr., Deputy Commissioner of Education for Massachusetts, writes:

> "We have much which would employ instructional television provided that there were educational television outlets to cover the state. With adequate outlets we can foresee an increase in television in this state in the next ten years. At the present time we are constantly expanding our television curriculum through Channel 2 in Boston, and will continue to do so. Also, we are contemplating producing an educational television signal for the western half of Massachusetts which is not now covered by us. We certainly feel that television channels should be reserved for education in sufficient numbers to provide for the future needs."

Hartford N. Gunn, General Manager of WGBH-TV, Channel 2 in Boston, which provides all of the educational television now available to Massachusetts, speaking of the needs of the next ten years, says:

> "We see the services extended to more groups within the community, plus multiple transmitters to serve a number of areas within the coverage of the high-powered transmitter; with unique local services that would not be justified for high-power wide area distribution. Eventual need will be for two complete state-wide systems, as well as the above mentioned."

On the basis of the reports of need, and of the development pattern evidenced in Massachusetts, at least six more UHF channels will be needed in the Boston area, and at least five additional channels for the localities in the state.

MICHIGAN

Michigan is a state with many problems, not the least of which is the problem of equal distribution of educational opportunities and facilities to all of the people in the state.

The major population centers are all located in the southern third of the state. These are seven, with a population of 150,000 to 2,000,000. There are also nine small centers with populations ranging from 50,000 to 100,000. Michigan has over 7,900,000 people and 78% of them live in the southern third of the state. Fewer than two million people are scattered in the rural areas. This in itself presents some unique problems of distribution of educational opportunities and facilities.

Michigan has 26 four-year colleges and universities with a total enrollment of approximately 145,000, and most of these institutions are located in the southern third of the state. In fact, most of them are located in the extreme southern part of the state. There are eighteen junior colleges with an enrollment of approximately 20,000 students. Three-fourths of the junior colleges are situated in the southern third of the state.

What is true of higher education is true also of the public schools. Michigan's public school enrollment is over 1,500,000, the major portion of which is concentrated in the southern third of the state. The north-central area and the northern peninsula areas have a school population distributed in very small towns and rural schools.

The rate of general population growth in the metropolitan areas of southern Michigan during the last 10 years was approximately 30%, while in the northern two-thirds of the state it was approximately 15%.

There are 13 reservations of television channels for education in Michigan. Only one of these -- located in a small, rather sparsely populated area in the north-eastern part of the state -- is in the VHF band. Among problems holding back development by the Michigan educational forces of the presently reserved channels for a primary educational service has been that all of the reservations are in the UHF band, while the state operates commercially almost 100% in the VHF band. An estimated 96% of all the receivers in Michigan are designed for reception on VHF frequencies. Aside from the educational Channel 56 in Detroit, the only other UHF operating in Michigan is the commercial station Channel 57, in Saginaw-Bay City.

Recently Michigan State University has arranged to utilize Channel 10, located just south of Lansing and well within the Lansing coverage area, in conjunction with commercial interests part-time as an educational station. There also has been a proposal to move educational Channel 11 from Alpena in the northeastern part of the state on Lake Huron to the central part of the state - in some position that could give coverage to areas like Grand Rapids, Muskegon, and Mount Pleasant. Such a relocation could readily result in the development of an extremely valuable public service and instructional service station.

Michigan is now carrying on a study to determine what is needed to give the state an adquate basic educational television service. Michigan has several collateral problems in education which somewhat inhibit the educational television survey being conducted by the Michigan State University and the State Department of Education.

One seeming problem in education in Michigan is the matter of the division of control for the various areas of education. For example, there is a Board of Regents for the University of Michigan. This is an autonomous board. There is a Board of Trustees which is an autonomous board. There is a Board of Education which has charge of general public education in the state, in addition to having authority over the various teacher-training institutions and junior colleges. All of these Boards are elected state-wide, and apparently are answerable only to the electorate. There is now some discussion in Michigan of bringing all the institutions of higher learning under state-wide control. The authorities of the three large state universities are opposed to central control. This general climate of lack of agreement has not hastened a central decision on state-wide use of television facilities in the universities, or of the development of a cooperative operational or programming effort.

There is no mistaking the interest in instructional television in Michigan, nor the desire on the part of educators on all levels to use it. In the general survey, 10 school districts indicated that they were now using television instruction; and 18 responding to the survey indicated that they were planning to use it in the future, as soon as it could be made available to them.

There were five universities which indicated that they were now using educational television. Six indicated that they planned to use television in the near future, and seven said they recognized that they had a very definite need for television in their future plans.

All of the state universities responding to the survey indicated that they expect to be a part of the Michigan Educational Television Network when it is established, and are willing to cooperate in any way possible to get such a network established.

Considering the long term needs of this tremendous population cluster in the southern third of Michigan, Channel 2, should be moved if possible, from Alpena, into the central area as previously indicated. There should be, in addition to retaining all the present reservations, an additional basic reservation in East Lansing and in Battle Creek, to serve the institutions now lacking an outlet for their services. The network resulting from the present assignments, plus the suggested additions, would make possible an interconnected basic educational service in Michigan. But, if the schools and junior colleges are to be adequately served, as well as the general public and higher education in these areas, this system will have to be at least a double system, and, in some areas, a triple and quadruple system.

If Channel 2 is moved, it should be replaced in the northern part of the state with a UHF channel. Present reservations there with that addition, could handle the basic service for education. This would be particularly true with the help of an interconnecting system, which some officials now believe can be provided at reasonable cost by the common carrier. But within the next 10 to 15 years the peninsula and the northern part of the state would need to be at least double channeled to provide the necessary scheduling. On this basis it is evident that a minimum of 27 additional reservations, distributed as indicated, is needed to protect the future educational and instructional television services in Michigan.

Dr. Lynn M. Bartlett, Superintendent of Public Instruction of Michigan, supports the basis of these needs, and the basis upon which the projections for the future are made. He says that Michigan's major needs are the utilization of educational opportunities throughout the state; and immediate and extended dissemination of new knowledge of instructional facilities and materials throughout the state.

Dr. Bartlett believes that some of these problems may be helped by the reorganization of school districts, and other provisions for equalizing educational opportunity. But he warns that large population increases, the availability of new knowledge and information, and increased financial support now in prospect will create increased demands and need for such facilities as television instruction.

Dr. Bartlett says that Michigan is now conducting a state-wide study to establish a basis for a state plan of television development and utilization. He predicts strong recommendations for broadcast television expansion will result, whatever else the final plan may embody. He suggests that it would be extremely effective to have a VHF service for educational television covering the major population areas of the state, but the UHF service backing up a basic network and reinforcing instructional facilities throughout the state is essential.

MINNESOTA

There are 3 large population centers in Minnesota. The two largest are in the east-central and north-east. The third center is in the vicinity of St. Cloud, which is also in the east-central part of the state. Over half of the population of Minnesota lives outside of the urban centers, in small towns and rural areas. During the past decade, the population increase in Minnesota was approximately 14%. The major portion of this increase was in the metropolitan areas.

Minnesota has 30 four-year colleges and universities and seven two-year colleges, with an enrollment of approximately 71,000. Public school enrollment is approximately 640,000. The enrollment follows the state population pattern, with over half the pupils in small towns and rural communities.

There are three educational television reservations in Minnesota - two in the eastern part of the state, in Duluth and St. Paul-Minneapolis; and one in the western part of the state at Appleton. The only channel activated at this time is Channel 2 in St. Paul-Minneapolis. This is owned and operated by a non-profit educational foundation, but services the colleges and universities and school systems of the entire area.

Channel 8, in Duluth, is expected to be activated soon; and Dr. Dean M. Schweickhard, Commissioner of Education, says that plans are being made to activate the station at Appleton. Various educational interests are considering the establishment of a series of translators or repeaters to extend the utilization of the service of Channel 2 in St. Paul-Minneapolis.

Minnesota, however, is a large state and the central and western areas of the state have certain demands which will have to be recognized and met in the future, if the needs of education are to be properly served.

Dr. John J. Neumaier is president of Moorehead State College, which is located in the western extreme of the state. He is hopeful that when Channel 13 (educational) in Fargo, North Dakota, is activated it will give the other institutions of higher learning, and education generally, an opportunity to have a television service. He points out the unique clustering in the Moorehead-Fargo community of a private liberal arts college, a land-grant university, and Moorehead State College. All of these are capable of making distinctive contributions to the curriculum, which complement rather than duplicate offerings. Dr. Neumaier notes that as his institution is growing rapidly the demands upon a limited faculty are increasing to the point where some sort of relief must be offered. He feels that a television service would add immeasurably to the college facilities.

From the experience in the eastern part of the state, and in other states, one station or one channel cannot provide all of the services needed. With the comprehensive job being done by Channel 2 in St. Paul-Minneapolis there is already need for an additional channel. As the increased demands for scheduling are met in the years ahead there will be additional needs in this area.

Dr. Dean M. Schweickhard, the Commissioner of Education, writes: "Our Channel 2 in St. Paul-Minneapolis is now broadcasting instructional television 45 hours per week and plans to increase that time."

He said that several translator stations have been set up on the fringe areas of Channel 2, and notes that the interest for college credit by broadcast television is increasing. "We anticipate a greater demand for educational programming. Channels should be reserved for education in sufficient numbers to provide for future needs," Dr. Schweikhard added.

On the basis of the information provided by the various educational interests in Minnesota and the projection of needs in increased usage of television instruction, at least 18 additional channels are needed in this state to serve the future needs for television instruction, and for general education.

MISSOURI

Missouri is one of the slower growing states. During the past decade its population, about evenly divided between the large communities and the rural areas, has increased less than 10%. There are four large centers of population in excess of 100,000 and three small areas with population in excess of 50,000.

Missouri has 44 four-year colleges and 14 two-year colleges, with a combined enrollment of approximately 85,000 students. The public school enrollment is approximately 790,000.

Missouri has four television channels reserved for education -- three UHF and one VHF. Two of the reserved channels have been activated -- Channel 9 in St. Louis, and Channel 19 in Kansas City. Channel 9 is owned by a non-profit community foundation, but extends services to area colleges and school systems, as well as to the general public.

The Kansas City UHF station now on the air is owned by the public school system. It is used primarily for instructional television. There is no state plan or organized state effort to provide educational or instructional television service to the people or the schools of Missouri. However, Dr. H. P. Wardlow, Assistant Commissioner of

Education, says that the Department of Education feels many areas of adult education have need of television instruction at the present time, and that there is a need to broaden the secondary education program in Missouri. He predicts that the demands for both in-school education and adult education by television will increase considerably in the ten years ahead.

The Assistant to the President at the University of Missouri emphasized not enough broadcast channels were available to education in Missouri to plan development of broadcast television there. He said that the state government is interested in such development if channels could be made available; but it is presently involved in tax problems which prohibit any great amounts of financial help for such development. He said he feels that Federal funds are essential to the development of this facility in the near future, and he feels strongly that it should be developed.

The general survey showed that eight colleges and universities in Missouri are now using television in some form for instructional purposes. Six other colleges and universities indicated that they saw a very definite need in the future for broadcast television. Seven school systems indicated that they were now using broadcast television for instruction, and ten indicated that they were planning to use it.

Dr. Irwin L. Peters, Dean of Administration at Central Missouri State College, said:

> "The dissemination of education is largely limited to those individuals who are able to be physically present in the classroom. This is a limitation which has no relationship to intellectual talent, or community needs. Educational television can provide instruction wherever there is a television signal of sufficient strength to produce a picture on a receiver.
>
> "Although the enrollment of higher education is exceeding the supply of qualified instructors -- and educational television can help to distribute better the talents of effective teachers -- an even more important problem is likely to be the increasing specialization of instruction and instructional equipment. There will be a few institutions which can maintain several different kinds of data processing equipment, and few institutions will have full-scale nuclear reactors. As instruction becomes increasingly dependent upon expensive and rare equipment television can provide one form of access to this equipment by a network or tape exchange which effectively interconnects several institutions."

Dr. Peters believes that educational television channels, at least in the basic service, must be compatible with the receiving facilities of the community. He also feels that a state-wide network serving the public, the schools, and the interconnected institutions of higher learning is the most practical approach to the problem.

On the basis of information and reports obtained in the survey from the state of Missouri, there need to be in addition to the present reservations, additional reservations for the basic system in the vicinity of Columbia. Some need is evidenced also in the southeast, central, western and northern parts of the state. If these were added, and the state network or the state system developed to the extent that it has been developed, and is being developed, in St. Louis and Kansas City, Missouri would need 24 additional reservations.

MISSISSIPPI

Mississippi is largely a rural state. It has only two areas with populations of 100,000, one is on the Gulf Coast in the resort area, and the other is the state capital, Jackson. Its total school population is in excess of 500,000, mostly enrolled in small towns or rural schools. Mississippi has 17 four-year colleges and universities and 27 two-year colleges, with a combined enrollment of approximately 33,000. These schools are well distributed throughout the state. Five television channels are reserved for education in Mississippi - four UHF channels, and one VHF channel at the Mississippi State University.

None of these channels has been activated, but activation of Channel 2 at State College is being discussed.

Dr. James Tubb, State Superintendent of Education, says:

> "We are definitely interested in developing educational television in Mississippi, but no definite plans are formulated as yet. A committee is at work on recommendations to make to the next term of the legislature."

This committee met recently in Mississippi with several outside consultants to draw together its formal recommendations to the legislature.

Based on an engineering projection, at least 10 additional channels of varying power will need to be activated in addition to those presently reserved in Mississippi, if the state's institutions of higher learning and its small town and rural schools are to be served by educational television.

MONTANA

Montana is a large state with a relatively small population, in the last census, of 675,000. The rate of increase is also relatively small. Because of its sparsely settled areas, Montana has a particular problem in providing equal educational opportunities to all its people. This makes the use of television instruction particularly attractive to the educators, and to the people of the state.

Montana has only four population areas over 50,000, and two population areas of more than 25,000.

The State Department of Education told survey consultants that there is a definite and immediate need for providing quality education on the elementary and secondary levels for Montana's sparsely populated areas. It is pointed out that higher education in Montana is in much the same situation as that in which the general public school system finds itself. In a system composed of small scattered units a central educational television facility could conceivably eliminate unnecessary duplication and proliferation of courses and improve general instruction.

The Department of Education does not believe that the population pattern in Montana will show a marked increase in the next decade. But it emphasized that the problems now existing in the distribution of educational opportunities and facilities will remain both in the school system and in higher education, and urged that television facilities be provided to help solve some of these problems.

The Montana Educational Television Committee, composed of educators and lay citizens is now conducting a survey and making plans for a state system of educational television. Dr. Thomas Moriarty, Dean of Education at Eastern Montana College of Education, is chairman and Dr. Erling S. Jorgensen, of the University of Montana, director of the committee.

The Committee believes that broadcast instructional television will be of great importance to the educational system of Montana and that the planning for its use must provide for its reception by every school in the state.

Basically, the reservation of channels for educational television in Montana should provide for dual service to all parts of the state. The Committee thinks primarily in terms of one channel for public school education and one channel for higher education. They do not envision separating the functions of these channels in such distinct use, but see at least two separate channels available in which each branch of education would have a particular advantage at a particular time, and in which each would be well served at all times.

Montana has nine four-year colleges and universities and two two-year colleges, with a combined enrollment of approximately 12,000. The public school system has an enrollment of approximately 146,000. The state Superintendent does not believe there will be any great increase in the overall population of Montana in the next ten years, but the University has projected an increase in public school enrollment of approximately 16% and an increase in enrollment in higher education of approximately 50%.

The Montana Educational Television Committee has drafted a tentative plan for a state network to provide the kind of basic system they feel needs to be initiated and which they plan to follow-up with dual channeling. It calls for a combination of high-power and low-power broadcast stations supplemented by a number of station translators to take care of the small isolated areas and valleys which cannot ordinarily be well reached by standard broadcast. The plan calls also for linking the state colleges and universities at Missoula, Bozeman, Billings, Butte, Havre, and Dillon, and the state capitol and the private colleges in the state along with the two important junior colleges.

This entails construction of nine broadcasting stations at the most technically and geographically feasible points about the state, and construction of 18 low-power translators to supplement the nine broadcast stations. On the basis of the projected coverage of each of the specified transmitters and translators the Committee estimates that 76% of the people in the state would have good reception from this system.

Montana now has six channels reserved for education -- five in the VHF band, and one in the UHF band. In the plan which has been developed by the Committee, all of the five presently reserved VHF channels at Missoula, Butte, Bozeman, Billings, and Miles City would be used. The Committee asks that Channel 10, now assigned in Helena, be moved to Great Falls and reserved in place of Channel 23, now reserved in Great Falls. It asks that Channel 7, now reserved in Butte, be moved to Helena, and reserved in place of Channel 10, moved to Great Falls. It asks that Channel 2, now assigned to Anaconda, be assigned to Butte-Anaconda and reserved in place of Channel 7, moved to Helena.

The basic network would also need the necessary frequencies for the connecting links, and for the translators, of which some could be UHF and some VHF. To this basic network, the Committee proposes to add a minimum of one channel as soon as finances and usage make such addition feasible.

What this means in the terms of television channel needs for Montana is: Channels 9, 2, and 10 to be added to the VHF band, and 10 UHF channels to be added to the reserved lists at the particular points of the primary broadcast stations. This is 13 additional channels for Montana, plus some rearrangement of the presently reserved channels.

NEBRASKA

Nebraska, a rural state, has two large areas of population in the extreme eastern part. The remainder of the state is composed of very small towns and rural areas. But Nebraska has 18 four-year colleges and universities and three two-year colleges, with a combined enrollment of 32,000 and its total public school enrollment is approximately 270,000.

Nebraska has only two channels reserved for education. One, Channel 12, at the University of Nebraska, in Lincoln, has been on the air for seven years and has taken leadership in the development of instructional television in the schools as well as in the community. Five additional channels have been requested in compliance with a state plan.

Dr. Adam C. Breckenridge, Dean of Faculties at the University of Nebraska, has had considerable experience with the use of broadcast television and has devoted much thought and study to the needs of the state in this area, responded:

> "Nebraska's primary needs are resources to provide a state-wide network, and establish an organization of all educational institutions in the state, both pre-college and college, for joint educational television undertaking -- both in organization and distribution."

Dr. Breckenridge says immediate plans call for an additional closed-circuit system for the main campus to supplement the present broadcast system, a network for three university campuses, (this will be at the main campus in Lincoln, the east campus in Lincoln, and the Medical Center in Omaha), and increased efforts to strengthen the total collegiate programming, instruction, and experimentation at all levels.

Nebraska has a state-wide organization for the promotion of educational television, the Nebraska Governor's Committee for Educational Television. This Committee is representative of the educational and interested lay forces in the state.

In addition, the Nebraska Council for Educational Television, Inc. provides televised instruction to elementary and secondary schools, and in-service teacher education to the area covered by Channel 12 in Lincoln. In this effort more than twenty-five school systems join with the State Department of Education, the University of Nebraska, Teacher's College, and the educational television station KUON-TV.

The Nebraska Council for Educational Television is currently activating a three-hop translator system to extend this educational broadcast service to additional schools.

A legislative resolution supports the further development of educational television in Nebraska, and urges further study of participation in the Upper Midwest Six-State Educational Television Network, which is now in the process of organization.

Dr. Floyd A. Miller, Assistant Commissioner of Education for Nebraska, said:

> "The potential of educational television is such that every area of our instructional needs could be improved if we had state-wide educational television facilities. Recently the Nebraska Council on Educational Television developed a program which combined instruction in elementary science with teacher education in an effective manner. This is opening up a whole new field of endeavor.
>
> "There is no doubt that the need for educational television will increase. Nebraska is a state of many small schools, some of which can never be properly organized into effective school districts, because of geography. Only by means of a state-wide educational television network can these schools obtain the advantages of the enriched instructional program which can be made available by this powerful new medium. Through a state-wide system, the best that is available in any part of the state can be made available

to all parts of the state. This means, for example, that some of the enriching features now available at the University station can become part of the broader educational picture of Nebraska.

"The in-service training of teachers is one of the most promising areas of educational television. Approximately 6,000 of Nebraska's 8,500 elementary teachers do not have college degrees. The upgrading of instruction through teacher education, therefore, is more important to Nebraska than to many other states, although obviously it is important everywhere. Another contributing factor to this need is found in the fact that the teacher shortage has required many persons to re-enter teaching after some years of absence from the classroom. Here again a state-wide facility is necessary if a positive impact is to be made on the entire state."

Study of the reports and the projections from the Nebraska Educational Television Council, the State Department of Education, and the University system, reveal that as a basic minimum Nebraska needs the five additional VHF channels it has requested and which are technically available. And, weighing the factors of expanded use of instructional television for in-school teaching, teacher education, extension, and continuing education, as projected by educational authorities in the state, at the minimum, this network would very shortly have to be double-channeled. Some areas, such as the Lincoln-Omaha region and some of the smaller areas to the west, would have to be more than double channeled. So projected, Nebraska would require 12 UHF channels in addition to the 5 VHF channels now being requested -- a total of 17 additional channels.

NEVADA

In many ways Nevada is unique among the states. It is a large state which has a very small population, and the major population is centered in the two large areas around Reno in the west-central part of the state and Las Vegas in the Southeast. It has a public school enrollment of approximately 60,000 and one university located at Reno with an enrollment of approximately 3,800. Channel 10 in Las Vegas and Channel 5 in Reno have been reserved for education, but neither has yet been activated.

Dr. Byron Stetler, Superintendent of Public Instruction of Nevada, says that if television receiving facilities can be expanded and extended in Nevada, there will be use for educational broadcasting. He also says that as facilities become available they will be used to a greater extent by the University and he believes that the channels now reserved for education should be continued to be reserved and sufficient additional channels reserved to protect future needs. The study made in Nevada shows that the prime service could be rendered by the two VHF channels now available there. But if any extended service should develop from the University, or from the central stations to the smaller population areas of the state, it would have to depend in some measure on translators, and on a microwave connection between the primary outlets. There should be an additional reservation at Carson City to take care of that area, and possibly another outlet which would probably be a satellite station at Alco, and Tonopaw. It is very difficult to project much beyond this particular situation at the present time. However, consideration of the potentials presented, with double-channel facility in the prime areas, and with the out-areas receiving a minimum service, coupled with the engineering portion of the study, shows need for seven additional channels.

NEW HAMPSHIRE

New Hampshire is a relatively small state with a small population, located mainly in small towns and rural areas. It has only six large central areas with populations exceeding 50,000. New Hampshire has 11 colleges and universities, with a total enrollment of approximately 13, 000 and a public school enrollment of approximately 100, 000.

New Hampshire has two television channels reserved for education - one UHF at Hanover, not yet activated; and Channel 11 in Durham, operated by the University of New Hampshire and the Educational Television Foundation. This station serves both the needs of the University of Durham of the surrounding school districts and communities.

Dr. Alice A. D. Baumgarner, of the New Hampshire Department of Education says:

> "Elementary and secondary schools have curriculum needs which can be served effectively through educational television, by bringing outstanding teachers, demonstrations, equipment, and materials, not normally available to our New Hampshire classrooms. Education through graduate courses for credit, and educational workshops to upgrade the teachers in those areas in the curriculum where few specialists exist, or where modern technological advances are rapidly changing the curriculum, is another important service which can be performed by television. Increasing numbers of children, competition for qualified teachers, low supply of well-trained teachers, will increase and perhaps double the need in the next ten years.
>
> "We need to extend our in-school service in New Hampshire to include services to primary grades, junior and senior high schools, and in-service teacher education. Although our present New Hampshire instructional television service to the intermediate grades is adequate, we have only begun to tap the rich resources in our state, regions and nation. One of the greatest needs is to extend our service to cover all of the school population. Our present station covers only 50% of the school population. We need a VHF channel reserved for educational purposes in the northern section of New Hampshire. The majority of schools not presently served by educational television are those small, understaffed, limited local-financed school systems."

Dr. Eldon L. Johnson, President of the University of New Hampshire, writes:

> "I am sure that there are many curriculum deficiences, instructional weaknesses, and facilities shortages that can be helped by using broadcast television. One area of possibility is in remedial courses such as English "A" now being taught to approximately 20% of our freshman class. In many cases an extremely high percentage of a department's time is spent in teaching introductory courses such as History I and History II or History of Civilization. This is a general requirement for all Liberal Arts freshman and perhaps could be done by one of our best lecturers, thereby, conserving the time of the rest of the department for their specialties. Extension work in both agriculture and general education can be revolutionized by television.
>
> "We have barely scratched the surfaces of the uses of educational television. We are certain, however, that for remedial teaching and general introductory courses, it can be used effectively. At all levels, television adapts well to courses that make use of demonstration or rely on the lecture technique. These are the areas in which the greatest pressure will be felt with the future increase in enrollment. One of the greatest areas of usage to help solve this problem of numbers is the possibility of teaching many of these courses by television throughout our university extension division. I certainly feel that television channels set aside for educational use should be preserved to that end. Also that applications for translators by educational television license holders should be given consideration."

Dr. Arthur E. Jensen, Dean of the Faculty of Dartmouth College at Hanover, says:

> "We believe that television has a real place in the educational program of the future. We are cooperating with other institutions in this state and hope that we can connect with Channel 11 and Channel 2 in the future. I am very eager to cooperate in any way possible so that the present wasted miracle of television can be used positively in the educational work in the country."

Educational and instructional television has made an excellent start in New Hampshire. If additional coverage could be made available to the north and central parts of the state, it would serve the basic need for a single service. However, a statement of the State Department of Education reveals that extension of instructional services to the lower grades and to junior and senior high schools, will create a scheduling problem and a load problem that will necessitate additional channels.

On the basis of the projections which have been made, and the information concerning the need for, and the development of, instructional television, at least two more prime stations need to be made available in New Hampshire (the extreme northern one probably spilling over into and sharing time with part of Vermont). In addition, a dual-coverage facility which would require four channels should be made available for the future.

NEW JERSEY

New Jersey, one of the smaller states in area, has a large (over 90%) urban population, well distributed. It has 25 four-year colleges and universities and three two-year colleges with a combined enrollment of approximately 85,000 and a public school enrollment of nearly 1 million.

New Jersey, or rather the educational institutions in New Jersey, was among the first to experiment with instructional television, but it has been one of the slower states in developing this medium. This lack of progress in an area so well begun, has been due mainly to a lack of political interest and support. But several state departments (such as the Department of Conservation and Economic Development) have expressed a desire to use instructional television to develop their programs, particularly among the in-school population.

A hopeful note in New Jersey came from Dr. Ernest E. McMahon, Dean of University Colleges and Extension at Rutgers University. Dr. McMahon says he plans to

> "reach a wide general adult population with college level materials, in a variety of curriculum subject." He said, "There is now and it will increase, a need to serve the huge expanding population in New Jersey. Currently only the north and central New Jersey areas are being served with in-school classes. Educational television is urgently needed to help serve the growing needs."

The growing need of which Dr. McMahon speaks is indicated in the growth of the population in this already densely populated area during the last ten years. The advance in New Jersey's population was 25% during this period.

New Jersey has six channels reserved for education. Properly used these could serve, on a cooperative basis, the basic instructional needs of the state at this time. But, recognizing that the state university and college system may be more closely tied-in with in-service teacher education and cooperative development of instructional materials for schools in the future, and reviewing the engineering report, there is evidence that these numbers should be at least doubled, in terms of the future needs.

NEW MEXICO

New Mexico, one of the larger states in area, is very sparsely populated. But New Mexico has been developing rapidly, and shows a population increase of almost 40% in the past decade.

New Mexico has 10 colleges and universities with a total enrollment of approximately 17,000, and a public school enrollment of approximately 210,000.

New Mexico has five educational television reservations. One channel has been activated, at Albuquerque. This station is a cooperative effort between the state university and the school systems, and also serves the general public.

The educational authorities at all levels, as well as the governor and the state legislature are enthusiastic about the possibility of educational and instructional television in New Mexico. New Mexico has organized a Commission on State-wide Television for Educational Purposes (this is referred to as STEP). This Commission has completed extensive feasibility studies, and has developed a state plan for the systematic development of educational television to provide full state coverage. Details of that plan have been carefully engineered and the use for it has been justified. The Commission says:

> "Use of television for educational purposes has increased sharply in New Mexico during the past year, placing the state among the leaders in development and use of this new medium of education. More than 10,000 children in public schools within a 110 mile radius of Albuquerque are now receiving a portion of their classroom instruction by way of television. It is estimated that 6,000 pre-school-age children are regular participants in daily television kindergarten classes. Hundreds of college students are receiving virtually all of their course material in humanities and bookkeeping by television. Several hundred teachers are participating in credit courses at the graduate level by means of television. Despite these rather startling figures, the potential value of television to the public schools, the colleges and universities, and the general public remains well above present levels of achievement."

To make sure that the level of achievement in television instruction keeps pace with the value of television to education, the STEP Commission has devised and engineered a comprehensive plan for state coverage for the years ahead. The report from the STEP Commission written by Dr. Claude Hempen, its director, states:

> "New Mexico will utilize television for educational purposes in three ways:
>
> 1. Open channel VHF broadcasting. There will be four VHF television stations needed to adequately serve New Mexico at present. These stations will be located in Albuquerque (Channel 5 presently

broadcasting), Las Cruces, (we are now investigating an assignment of a VHF channel to that area for New Mexico State University and the New Mexico State Department of Education), Portales (where we will also request a VHF channel assignment), and Gallup (where Channel 8 is now reserved for education). The station at Gallup will be owned and operated by the State Department of Education and the Indian Agencies. (The channel will be concerned with television for educational purposes for the Navahoe, the Zuni, and the Hopi Indian Reservations.) Roswell has an assignment of Channel 3 for educational purposes and will be the last of the VHF channels to be activated. It is planned that the Roswell channel will be activated in about five to six years.

2. UHF low-power service. Each of the institutions of higher learning will need from two to four UHF channels assigned for institutional use. Albuquerque will request eight UHF channels, four each for the Albuquerque public schools and the University of New Mexico; Las Vegas with Highlands University will need two to four UHF channels; Portales, with Eastern New Mexico University will need two to four channels. Roswell, with the New Mexico Military Institute, will need two UHF channels; Las Cruces with New Mexico State University will need four UHF channels; and Silver City with New Mexico State Teachers College will need four UHF channels. All of these channels will be operated on low-power for specific local broadcasting.

3. Translator networks for the VHF outlets. We will have 20-24 translators not including those necessary for the Indian Reservations.

"These three systems will afford New Mexico 95% coverage with a guaranteed signal strength above 1,000 microvolts to each receiving antenna. In summary the state of New Mexico will need in addition to its present station, three VHF outlets, 20-24 UHF outlets and 20-30 translators to adequately serve the state with television for educational purposes."

With such a detailed plan, and with organized support from the governor, the state legislature, and the combined educational community in New Mexico, that such a plan makes full provision for the future growth of the state.

NEW YORK

New York is the largest state in population. It has seven large population centers and, with the exception of the New York city area, the large population centers lie in a line east to west through the north-central portion of the state. Approximately 85% of its people live in metropolitan areas. But, significantly, while the state in the past ten years, was increasing in population by 13%, its major population centers were losing about 2% of their population. Suburban areas surrounding the central cities of the metropolitan areas during the same period increased in population by 68%. These figures are particularly pertinent to the distribution of educational opportunities and instructional facilities.

New York has 125 four-year colleges and universities with a total enrollment of 360,000 and 22 two-year colleges with an enrollment of approximately 26,000. Its public school enrollment is approximately 2,700,000.

New York, as a state and through its university system, made the first large effort to take advantage of the educational television reservations and tried to activate the channels reserved there. Many different forces have moved to prevent the wide-spread development of educational television until this time.

The Regents of the University of New York have urged the development of educational television since 1950. They believed then and are more convinced now, that television presents an unusually effective means of extending an improvement of educational opportunity.

In 1952 the Regents requested and received, from the Federal Communications Commission, construction permits for 10 UHF stations strategically located throughout the state. These stations were intended to serve as a nucleus of a state-wide educational network, that would serve both the classrooms of the schools, as well as the homes of the state. However, state funds were not forthcoming and the 10 construction permits were never used.

At Cortland, New York, the Regents were able to establish a closed-circuit television system in which the schools of the city and certain outlying areas are connected by coaxial cable. A special feature of this particular experimental project is a talkback system. Similar projects, used in the training of teachers, were also initiated by the Regents in two of the State Colleges of education. Through the efforts of the Division of Educational Communications of the State Education Department, several other locally financed projects have been started, or are in varying stages of development.

The Regents are convinced that only through a systematic plan of state support can this medium reach the level of use in education it deserves to attain. They have proposed that the state proceed immediately to stimulate the further development and use of educational television in the state by:

1. Providing financial assistance to school districts for this purpose;

2. Contracting to assist state-approved local area educational television councils;

3. Activating a state-wide system of expanding educational television for use at college level education.

At this writing the New York State Legislature had not passed upon these recommendations, but the New York Department of Education had included $577,700 in its 1961-62 budget request to continue the various educational television projects already being carried on.

There have been other regional and local efforts to develop broadcast television for educational and instructional purposes in New York.

The Rochester Area Educational Television Association was organized in 1958 by the Board of Regents to construct, own, operate, and maintain non-commercial education television and radio stations within the Monroe County. In 1961, the Rochester Area Educational Television Association filed a request with the Federal Communications Commission for the drop-in and reservation of Channel 13 in the area for the use of education in that community. In its petition, the Association said:

> "Through the efforts of the Rochester Educational Television Association the people of the eleven-county Rochester area have become aware of the incalculable benefits which non-commercial television could bring to Rochester, and they have become more and more vocal in expressing the need and desire for an operating VHF educational television station. The community interest is present, the educational need is acute, and the three-year record of experience of RAETA is clear evidence that a reserved Channel 13 is both practical and feasible. The opportunities for enrichment, stimulation and challenge through educational television programming is tremendous both in the schools, and, perhaps, more importantly, in the homes of this large area. It would, indeed, be most regrettable if this last and golden opportunity to provide educational television service to over a million persons in the eleven-county Rochester area were lost through failure to reserve Channel 13 for educational use."

The Federal Communications Commission denied this petition, and ruled that a third commercial outlet in the VHF band was more important than an educational station with compatible service. The educational community immediately started proceedings to appeal this decision.

In the Schenectady-Albany area there exists the Mohawk-Hudson Council on Educational Television. This Council includes eight colleges and 50 school systems. It has requested and received an additional UHF channel assignment to that area and hopes soon to have one or both of the reserved channels assigned to that area activated.

The Western New York Educational Television Association in Buffalo has Channel 17 on the air. This was one of the original channels reserved for education in that area. Local associations achieved its activation. An application has been filed by the school districts adjoining Buffalo for an additional station and they expect to go on the air in the near future.

Syracuse does not have an active station, though it has a UHF reservation. Syracuse University, a leader in the field of television instruction and research, and in the production and development of educational programs, is at this writing exploring the possibilities of sponsoring a drop-in VHF channel. It has an application pending now with the Federal Communications Commission. The University is also planning to work cooperatively with the Syracuse Board of Education in constructing and operating an educational station on a UHF reserved channel in that area.

Dr. Kenneth G. Bartlett, Vice President of Syracuse University, says:

> "Syracuse University has every confidence and expectation that educational television will constitute a very important part of the educational program for all individuals of all ages in the near future. This community, therefore, not only needs a UHF station but the educational organizations within the community must continue as they have in the past to utilize the channels of the commercial stations whenever possible."

One of the most inhibiting factors in the development of broadcast television in the down-state New York City area has been that no VHF channels were available in this huge metropolitan area, which has a potential audience of between 23 and 24 million people. The UHF channel originally allocated to New York, because no channels in the VHF range were available at the time of the reservations, has been practically useless as a prime broadcasting station for educational services. This is because the area total service is in the VHF band and, therefore, practically all the receiving capabilities in the area are tuned only for VHF reception.

Arrangements recently have been made to purchase Channel 13 in the New York city area for educational television purposes. If this purchase is consummated, it will be a large step toward the development of a total broadcast service for this area. In addition to this effort, the Federal Communications Commission is conducting an extended experiment with a special UHF station to see to what extent UHF can be adapted to large city usages where unusual amounts of physical and electronic interferences exist. From these two efforts may come a totally new kind of progress in the development of educational and instruction development of television in the New York city area.

In summation, the future needs of New York as reflected in the survey, in addition to the presently reserved channels, are for a minimum of 36 UHF channels to supplement the educational and instructional services throughout the state. The survey indicates also that such larger areas as Rochester, Syracuse, Buffalo, and northern New York State need to be provided with VHF facilities if it is at all possible technically.

NORTH CAROLINA

North Carolina is largely a state of small towns and rural communities. However, in the central part of the state is the so-called Piedmont Crescent, a highly urbanized area stretching from Charlotte on the southwest to Winston-Salem and Greensboro on the north and Durham and Raleigh on the east. There are eight centers in North Carolina with populations of over 100,000 and 26 areas with population of over 50,000. The bulk of this population lies in the central part of the state.

North Carolina has 38 four-year colleges and universities and 16 two-year colleges with a combined enrollment of approximately 66,000 and a public school enrollment of over 1,900,000.

There are eight television channels reserved for educational television in North Carolina, but only VHF Channel 4 at Chapel Hill has been activated. The Consolidated University of North Carolina (which is composed of the University of North Carolina at Chapel Hill, North Carolina State College in Raleigh, and the Women's College at Greensboro) owns and operates Channel 4, with microwave interconnected studios on each campus in these three cities.

These production centers which feed the Channel 4 transmitter in Chapel Hill service the in-school television instruction of the surrounding North Carolina communities. The programs are fed also to six commercial stations which voluntarily carry the broadcasting during certain hours of the day. This one transmitter with its three interconnected studios has done a very effective job on both the school and college level in North Carolina, but there is a demonstrated need for additional service and several plans have been put forward to accomplish this.

One proposal was for the establishment of 10 translator stations in the western part of the state extending from Albemarle in the west-central portion through Charlotte; Gastonia and Shelby on the south and through Canapolis, Statesville, Morgantown, and Hickory; and on the north to Asheville and Hendersonville at the focal point in the extreme western part of the state.

Survey consultants learned that the Consolidated University of North Carolina and the State Board of Education had done some exploring of the possibility of joining forces with a common state commission for educational television, in order to get done the collective job they estimate needs to be done. Indications from these sources are that to properly service North Carolina at least two VHF channels will be needed in the eastern part of the state, and approximately 15 UHF channels to the west of the present operation. These would be channels of varying power. Many would be of low power. This would provide only for the single basic service to the various communities in the rough mountainous terrain of the northwestern part of the state. To provide for complete in-school instructional services at the various grade levels, in the future, as well as for higher education, it would be necessary to at least duplicate or parallel the basic system.

In Charlotte Channel 36 went on the air on September 5, 1961. It was licensed to operate primarily as a commercial station, but at this writing it is devoting its entire program schedule to in-school and educational broadcasting in cooperation with

Mecklenburg County Public Schools. This program service is expected to continue and perhaps increase. The schools are picking up the in-school and general programs originating at Channel 4 in Chapel Hill, and in addition are producing local programs to meet specific needs.

The State Department of Public Instruction in North Carolina issued a statement that says:

> "As is true throughout the country, Carolina is faced with an exploding school population. Numerous steps are being taken to provide quality education for this tremendous increase in students. Instructional television has proved itself in North Carolina as a teaching tool and increased use is necessary to help meet the increased needs of education. Recommendations have been made by the State Board of Education to strengthen and increase the present use of instructional television in the public schools, and to expand broadcast facilities. Most certainly additional facilities should be made available for educational purposes. Because television is the most powerful communication medium yet devised by man, it follows that a substantial protection be provided for its use in and by education."

This survey of North Carolina clearly indicates the acceptance of instructional television in the schools and colleges and in the communities of North Carolina, and that the present reservations are inadequate to meet the needs and the planning for further expansion there. The evidence suggests that, in addition to two VHF channels in the eastern part of the state, a total of 27 additional UHF channels be made available to North Carolina, for purposes of instructional and educational television.

NORTH DAKOTA

North Dakota is a large, very sparsely populated state. There are no major population centers in North Dakota. The two largest areas, Fargo and Grand Forks, are in the extreme eastern part of the state on the Minnesota border. The size of the state and the sparsity of its population present a particular problem in the equal distribution of educational opportunities and facilities. In the public schools scattered in the small towns and the rural areas throughout the state are 130,000 students. There are 11 colleges and universities in North Dakota, with a total enrollment of approximately 14,000.

Dr. M. F. Peterson, Superintendent of Public Instruction of North Dakota, said:

> "The people of North Dakota are progressive, and they see the need for educational television. Efforts are now in the planning and experimental stage, but the only way that educational and cultural needs in North Dakota can be met is through broadcast television."

Dr. Peterson says he feels that the people will demand educational television, that the recent action of the legislature indicates this. The action of the recent legislature was the first legislative support the educators have received in the state-wide development of educational television. As a result of the new emphasis and increased desire for broadcast channels occasioned by the legislative action, Dr. Peterson states that he definitely believes that sufficient channels should be reserved in North Dakota for the eventual needs of the state.

The legislative action, while not great in extent, has the capacity to influence the future use of educational television in North Dakota. The legislative action was contained in Senate Bill #179 of the 37th Legislative Assembly of North Dakota. It authorized the Superintendent of Public Instruction to contract with non-profit corporations for the provision of educational services in the state and made appropriations for this purpose.

The sum of $46,356 was appropriated to the Superintendent of Public Instruction for the purpose of contractual payments in carrying out the provisions of the act during the two-year period following.

The North Dakota State University at Fargo substantiated the suggestions put forth by Moorehead College in Minnesota. It said:

> "The Fargo-Moorehead twin communities have three institutions of higher education - North Dakota State University, Moorehead State College, and Concordia College. Even though there is every likelihood that we will have a community owned and operated station within the year in Fargo, at least one and preferably two channel reservations in addition to those we already have would be wise planning. It may be possible to work a single channel reservation among the three institutions, but since two are in Minnesota, and we are in North Dakota, inter-state financing would be a problem. Two channel reservations, one for NDSU and one in Concordia might best fit the long range plan."

North Dakota State University also said that broadcast television would help them relieve some of the pressures, particularly in the basic, high enrollment courses. The university pointed out that broadcast television would allow it to serve at home many of those students among the 30% who come from a 25-mile radius. In addition, broadcast television would allow it to serve a much broader educational audience. The university anticipates a budget for facilities and personnel in the next legislative session in 1963. A first effort in this direction could be in the form of closed-circuit facilities with cable links to the community owned broadcast station in Fargo. In any event, the survey indicates that the University will ultimately need its own outlet or outlets.

North Dakota now has six channels reserved for education. Three of these channels are VHF and three are UHF. The larger areas of population in Grand Forks and Fargo in the eastern part of the state have VHF channels reserved. Should the plans projected by the State Department of Education and the ideas of broadcast television use which motivates the legislative interests mature, at least one additional channel will be needed in each of the present outlets. There are at least one or two intermediate areas which would be served well by low-power UHF stations. A projection of the plans and aspirations of the educators in North Dakota and of the indicated needs shows that at least eight additional channels need to be reserved for future use. Six of the eight parallel the present locations of assignments and at least two are needed to serve as extended satellite stations in isolated areas. North Dakota will be a vital part of the Upper Midwest Six-State Network which is now being organized with Minneapolis as its focal point in the northwest and Omaha-Lincoln as the focal point in the south.

OHIO

Ohio is a very populous state with seven large metropolitan areas, and 14 small centers with populations in excess of 50,000. It has 61 four-year colleges and universities with an enrollment of approximately 167,000, and four two-year colleges with a total enrollment of approximately 4,000. Its public school enrollment is approximately 1,800,000.

Instructional television has had considerable development in Ohio. Four channels have been activated and the stations operate instructional programs on all levels of education, as well as for the general public. However, community programming in Ohio has been extremely inhibited by having all its educational channels in the UHF band. The predominant service in Ohio is VHF and the majority of available receivers in the communities are therefore tuned for VHF reception only. Considerable headway has been made in some areas, such as Columbus and Cincinnati, in procuring conversions to UHF reception, because of the kind and quality of programming which emanates from these stations.

Five UHF channels are reserved for education in Ohio, in addition to those now on the air, and an additional channel has been requested at Athens.

In 1960 the Ohio Legislature created the Ohio Interim Educational Television Study Commission, and charged it with the responsibility for conducting an

> "engineering study, and such other studies, as may be necessary to determine the feasibility, the cost, and the requirements for establishing and providing state-wide educational television network services, whereby the educational television programs, station facilities, and channels now in use or obtainable, may be made available to every Ohio citizen in and out of school."

In February 1960, the Governor appointed a nine-member commission to make this study and report back to the Legislature in 1961.

The study brought out that 10 universities in the state were using television facilities, of one kind or another, and that four of these institutions had access to educational broadcast stations. The study found that a number of organizations had been formed among communities and school systems that were planning early development of educational facilities. In addition to the four stations on the air, the study learned that four additional stations were in the advanced stages of planning.

The study discovered that 97% of the residents of Ohio are within a 25-mile radius of a college or university, and that the total colleges and universities are servicing well over 160,000 students, a number expected to double during the decade ahead.

The Interim Study Commission recommended to the 1961 Legislature that legislation be enacted to create an Ohio Educational Television Network Commission, and to invest it with the authority and the funds to proceed with the establishment of a state-wide educational television network. It further recommended that the Educational Television Commission have the authority to own and operate educational transmission and interconnection facilities, or to contract for interconnection facilities, for an educational television network; and to establish standards for such facilities, whether owned or leased; to execute contracts, and to determine the programs to be distributed on the network, with the advice of an advisory program board composed of educational representatives in the state as well as educational broadcasters.

The Commission further recommended that sufficient funds be appropriated at this time to the Ohio Educational Television Network Commission, and implementation and operation of the first phase of the proposed network be undertaken during the next two years.

After a thorough engineering study, the interim commission report recommended in summary a plan for a single basic service for the state:

> "SUMMARY
>
> "A plan has been developed, in four phases, illustrating one method of providing a state-wide educational television broadcast system for the state of Ohio. The examples of studio production center development have been outlined and integration with the existing broadcasting facilities has been discussed.
>
> "A total of 29 UHF stations, including six low-power translator-type stations has been envisioned. In order to implement the plan fully it also would be necessary to request the addition of certain other UHF channels to the table of assignments of the Federal Communications Commission. Other UHF channels in certain areas would have to be changed by similar requests from non-reserved status to educational use.

> "In all probability the minimum of one year would be necessary following any enabling action to establish the required pattern of channels through the rule making process of the Federal Communications Commission. In such cases where channels have already been reserved for educational use activation through construction of facilities would typically require a period of about one year. Experience gained in connection with the program as it develops should be put to use with such modifications of this broad study as may be required. In particular the coverage areas of the stations predicted today may in a few years prove to have been too conservative. This would be true if the expected sensitivity improvements, which seem possible in UHF receivers, become economically practical. Such developments may nullify the need for certain of the intermediate and lower-power stations. Other developments, however, may lead to the establishment of additional program centers and transmitters to meet the local needs in additional communities."

The proposals in Ohio would require the addition of at least 20 channels to the state in order to provide this basic single channel network system. But these 20 and 9 channels that would then be available to the state would provide only the single system. Extended use of television instruction at the various levels in the schools and colleges would require more than one channel for adequate servicing. In some instances it would require three or four channels. Therefore, it is evident that the 29 channels initially proposed on the basis of present use in Columbus, Cincinnati, and Toledo, and the proposed use in such places as Cleveland and Akron, would be inadequate; more must be provided for the future use of educational and instructional service. A minimum of 58 additional channels is needed for future educational purposes in Ohio.

OKLAHOMA

Oklahoma has two large population centers in excess of 100,000 and seven small centers. Approximately two-thirds of the people live in small communities and rural areas, which presents specific problems in the equal distribution of educational opportunities and facilities.

Oklahoma has 18 four-year colleges and universities and 13 two-year colleges with a combined enrollment of approximately 50,000. Public school system enrollment is approximately 514,000.

Channels 13 and 25 in Oklahoma City and Channel 11 in Tulsa have been activated for educational instruction. These stations are part of an educational television network which is eventually expected to cover the entire state. The administration of educational television directed by the Oklahoma Educational Television Authority, a state Authority established by legislative action several years ago.

Most of the initiative for educational television in Oklahoma derives from the Educational Television Authority, and from the Oklahoma City Public Schools. The basic channels - 13 and 11 in Oklahoma City and Tulsa - are concerned principally with adult and community education, but make available direct instruction and supplementary instruction to schools desiring to use it.

Channel 25, which is owned by the Oklahoma City School System, carries a heavy load of instructional in-school television and has been very successful, not only within its own system, but in its sharing of instruction with neighboring systems and through the exchange of facilities.

Survey responses from various sources in Oklahoma indicate that the colleges and universities, aside from those actually operating or engaged in the operation or programming of the stations, have little desire for participation in instructional television. This apparent apathy could stem from the physical circumstance that many of the institutions are outside the range of either Channel 11 or Channel 13.

The school systems have shown a great deal of interest in, and have developed a great deal of use for, instructional television but the sources for in-school television are limited generally to the Oklahoma City School System and its neighboring districts.

Dr. E. F. Bryan, of the Oklahoma Department of Education, says there is need for educational television in Oklahoma and that demands for it are increasing as teachers and parents become more aware of the potential of using television for instruction. Present needs are greater than can be financed, he says, but increased funds for instructional television have been requested from the state legislature, with slightly more than $550,000 requested for the next two-year period.

Dr. Bryan sees a need for more channels throughout the state and greater power, and for additional equipment. The Oklahoma City station covers only a radius of about 90 miles and the Tulsa station a radius of only 50 miles. This is inadequate even from the standpoint of a basic service for the greater part of the Oklahoma area.

A number of the educators interviewed in Oklahoma said that in their opinion advent of federal funds for the development of educational television facilities would spark the addition of local funds, and make possible the development necessary to meet the indicated needs.

It is difficult to project on the basis of survey responses alone a total need for channels in Oklahoma, because of the particular state of development they reflect. There is evidence to indicate that there should be at least two additional VHF channels in the state (one in northwest, one in the southeast), if possible, and that there should be provision for future dual channeling as more of these small prairie schools become dependent upon instructional television as a source of quality instruction.

A projection on this basis, coupled with an engineering projection, indicates a minimum need for 17 additional channels for educational television in Oklahoma.

OREGON

Oregon has one large center of over 100,000 and five small centers of over 50,000 population. Much of the population lies in the extreme western part of the state. More than half the people of the state live in small towns or rural areas.

Oregon has 21 colleges and universities with a total enrollment of approximately 34,000. Public school enrollment is approximately 375,000. The state has three educational television reservations, two of which have been activiated. The three stations are in the extreme northwest corner of the state in the region of the greatest concentration of population.

The two stations on the air, Channel 7 at Corvallis and Channel 10 at Portland, are owned and operated by the Oregon State System of Higher Education. The General Extension Division is directly responsible for administration of the State's Educational Television Network. Through the interconnecting of Channel 7 and Channel 10, the Division can provide continuing education and instructional services to 70% of the state's population.

Plans are now being made to extend broadcast facilities to the Oregon College of Education, Southern Oregon College, and Eastern Oregon College. The needs of these institutions are now being documented. As yet there are no reservations provided for education in eastern Oregon, but authorities believe consideration must be given the areas of Medford, Klamath Falls, Pendleton, La Grande, Bend and Lake View. And along the coast there must be consideration of Astoria, Newport, and Coos Bay. There is also an expected need for multiple low-power channels by communities within the present service range, to serve local school district needs.

The Department of Education of Oregon is charged with the responsibility for the development, coordination, and approval of all educational television programs for in-school viewing for all elementary and secondary schools in the state; and for in-service education programs for teachers. Present plans call for providing an in-school teacher service on a state network basis for grades kindergarten through grade 12, beginning with five hours weekly and growing to ten hours within two years. However, the state network will not serve all of the local needs. Demands for local educational television channels are expected to come within the next ten years from eight to twelve additional school districts in the population centers.

Oregon has made a rather impressive start toward developing a high-quality television service for its citizens, and for all levels of formal education within the state. The backing of the state government and the cooperation between the two levels of education in the state is expected to continue. Simple mathematical extension of the projected plans indicates Oregon will need a minimum of 17 additional channels for educational and instructional television.

PENNSYLVANIA

Pennsylvania has six large metropolitan areas with populations over 100,000 and 24 small areas with populations over 50,000. Two-thirds of the people live in metropolitan areas.

Pennsylvania has 121 colleges and universities with an enrollment of approximately 190,000. Its public school enrollment is approximately 1,900,000. It has three educational television stations on the air. Two channels reserved for education are not yet in use. Stations on the air are Channel 35 in Philadelphia and Channel 13 and 16 in Pittsburgh. An application by Pennsylvania State University to the Federal Communications Commission for an additional VHF channel has been dismissed by the Commission.

Pennsylvania State University writes:

> "Our interest in broadcast television is chiefly as a means of extending the facilities and services of our University to the people of the Commonwealth of Pennsylvania. Television broadcasts would be used to strengthen and extend our agricultural extension and continuing education programs into many areas. It is possible in the future that we may need to use broadcast television for formal courses of instruction also. Through the use of a broadcast facility we also hope to provide high-quality educational programs to the people of central Pennsylvania by linking up with the educational television stations in Pittsburgh and Philadelphia, and with the NETRC in New York,"

In its application to the Federal Communications Commission for a VHF channel with high power and long range in central Pennsylvania the State University said:

> "The establishment of an educational television station, using Channel 3 with its transmitter and tower on Rattlesnake Mountain near the University, would provide a key section, a central link, for a state-wide educational network. Such a station could be linked on the west with Pittsburgh and through Harrisburg and Lancaster to Philadelphia, thus an axis of educational television facilities would be established at the center of the state. Branch links and stations could be built for other densely populated parts of Pennsylvania as these facilities become feasible. This would, in time, serve as a major educational communication link between the cultural centers of the northeast and those of the midwest, in bringing about a reciprocal exchange of programs of incalculable and mutual benefit.

> "Moreover, the telecast area adjacent to Pennsylvania State University is the home of one million people. Within a radius of 25 miles of the University there live about 155,000 people, of whom 35,000 are children of school age. The enrollment figures here at the University in 1959-60 were 20,377 under-graduates and graduates. Most of these students are in residence for the greater part of four years. The educational lives of most of these people could be enriched by judicious supplementary use of Channel 3."

The Federal Communications Commission in a report and order effecting short-spaced VHF assignment issued in the summer of 1961 dismissed the petition of Pennsylvania State University as being inconsistent with the policy of promoting greater use of the UHF band of frequencies which it established at this time.

In further extension of broadcast television in Pennsylvania, Philadelphia has applied to the Federal Communications Commission for use of Channel 12, assigned to Wilmington, for general broadcast of educational and instructional programs, in addition to Channel 35 which it now has on the air. This application is in hearing and the decision of the Federal Communications Commission is pending as of this writing.

Six Pennsylvania colleges and universities indicated in the general survey that they are now using instructional television in some form, 11 colleges and universities indicated that they plan to use it, and 20 indicated that they were recognizing future need for the use of broadcast television in their planning. Twenty school systems indicated that they now use instructional television and seven of the respondents indicated that they plan to use it.

Dr. Marcus Konick of the Pennsylvania Department of Education sees a continuing need for the use of educational television for the in-service training of teachers, the sharing of college and university facilities, the up-grading of curriculum in many areas where there are shortages of teachers, the teaching of home-bound students, and adult and special education.

Dr. Konick believes that the need for broadcast television will increase because of the exploding population, the necessity of increasing skills and retraining the technologically unemployed in the community, the general and continuing teacher shortage, and the general increase in the length of our mean education.

Dr. Konick says Pennsylvania is currently developing a plan for full utilization of the potential of television through development of a state-wide network and by maximum use of the presently available facilities now on the air. He says that for this reason sufficient channels need to be reserved for educational use in Pennsylvania and suggests at least 14 additional UHF channels for the use of the State Colleges alone.

Pennsylvania responses to the survey provide adequate justification for a general VHF station in Philadelphia or in the Philadelphia vicinity, a VHF station in the vicinity of Erie in the northwestern part of the state, and a VHF station in the central part of the state at University Park, and a VHF station in the northwest in the vicinity of Scranton.

In all these areas there are large numbers of institutions of higher learning, in addition to the public school systems which, according to the State Department of Education and local school administrators, need additional assistance in strengthening their curricula.

Development of these needed stations, provision of the additional channels for the State Colleges as suggested, dual channeling on the major stations for in-school purposes, and provision of at least primary consideration of smaller population centers such as Harrisburg and Lancaster, Chambersburg and Altoona, and Oil City would require an addition to the allocations for education in Pennsylvania of four VHF channels and 24 UHF channels.

RHODE ISLAND

Rhode Island, the smallest state, has a large educational problem. It has nine four-year colleges and universities, and one two-year college, with a combined enrollment of approximately 18,000. Its public school enrollment is approximately 125,000. Rhode Island is a part of the densely populated area from New York to Massachusetts.

The one television channel reserved for education in Rhode Island has been assigned to Providence. This is UHF and not compatible with most of the receiving equipment.

Rhode Island colleges responding to the survey indicated need for a VHF channel for the use of education in the state. They indicated, also, a readiness to cooperate with one another in the development and use of such a channel.

The Governor of Rhode Island recently established an educational television advisory committee to study the problems incidental to the establishment of an educational television service for Rhode Island. Dr. Michael S. Walsh, Commissioner of Education for Rhode Island, says instructional needs exist in the public schools for elementary science and teaching of foreign languages, both of which could be helped by the use of television. He adds that adult education needs could be met, to a great degree, by television programming. And if, as indicated, the state colleges soon may not be able to accept all applicants, instructional television programming of college courses could lessen this problem considerably.

Dr. Walsh says the Commission to Study Higher Education in Rhode Island reports that school enrollment will increase by one-third within the next 20 years and that by 1980 the college-age population in Rhode Island should increase 82% over what it was in 1958.

Dr. Walsh says indications are that not enough teachers will be available to meet these challenges to education, and that assignment of UHF or VHF channels should be made with regard to the reception potential of the area. He points out that Rhode Island is a VHF area and now has a UHF allocation for educational purposes. He feels this should be remedied.

The evidence shows that this small state, with its multiplicity of problems equaling those of much larger communities, would be helped significantly by a VHF allocation which could be used by the State Department of Education, and, possibly in conjunction with the present UHF channel, used strictly for in-school programming. An additional UHF channel, making a total of three channels for Rhode Island, should also be available in the years ahead.

SOUTH CAROLINA

South Carolina has four large centers with populations over 100,000 and nine small centers with populations over 50,000. This population is well distributed. It has 26 four-year colleges and universities and four two-year colleges with a total enrollment of approximately 31,500. The public school enrollment is approximately 600,000.

South Carolina has four television channels reserved for education, but none of them is in use. It has been in the process of developing a closed-circuit television system. The state educational television production center in Columbia sends programs over the leased facilities of the common carrier to 70 high schools in 21 counties. The General Assembly at the 1961 session authorized the South Carolina Educational Television Center to extend its services to more areas of the state. Despite this expanding operation, the general manager of the South Carolina Center writes:

> "As you make your survey of educational television needs I would like to express the needs of South Carolina as they pertain to frequency allocation. We anticipate the need for UHF service in the following cities: Conway, Andrews, Moncks Corner, Charleston, Waterboro, Beaufort, Hampton. St. George, Kings Tree, Lake City, Marion, Bonnetsville, Florence, Sumpter, Orangeburg, Blackville, Aiken, Saluda, Greenwood, Clinton, Chester, York, Gaffney, Spartanburg, Greenville, Clemson, Walhalla, and Anderson. I believe this totals approximately 35. Some modification of this number would be possible if the Commission would see fit to allow us to cover some of these areas by feeding directly from our closed circuit facilities into medium-power translators, providing these translators could be used on some of the lower channels."

Dr. Jesse T. Anderson, State Superintendent of Education for South Carolina reports:

"Although we have closed-circuit television in South Carolina, I have always been

> an advocate of broadcast television and I hope that some day we may eventually use the channels allotted to South Carolina. As for our needs, let me say that three channels -- one VHF, and two UHF -- would not cover the state. We have 1,418 schools; 614 white elementary, 269 white high, 389 negro elementary, 146 negro high. Our enrollment this year was in excess of 610,000 and estimates for the present year are 620,000. We expect an annual increase for the next ten years of 10 - 12,000. You can see from the above figures that it would be difficult to cover the state by closed-circuit television, and I have already stated three channels will not cover the state."

What Dr. Anderson did say is that South Carolina will need its closed-circuit operation plus an extended operation of open circuit broadcast in order to meet instructional needs. The indicated need of the various communities is for service by 35 low-power UHF boradcast stations. Survey respondents said Channel 7 in Charleston should be activated for the general use of that area, along with an additional station in Columbia, center of the state and state capital. On demands projected by Mr. Kalmback, General Manager of the Closed Circuit Operation, and by Dr. Anderson, State Superintendent of Schools, South Carolina requires at least 32 additional channels for its future operations.

This proposal, of course, is based entirely upon service to the public schools. It reflects no extended service for higher education in South Carolina. But since, in the general survey, the state university and two of the colleges in the western part of the state expressed interest in the development of instructional television some provision should be made for future facilities for higher education. Even allowing for the sharing by higher education of some of the working facilities envisioned by the State Department of Education and the closed-circuit system, there should be at least five additional channels provided for special on-campus service. This would mean a total of 38 additional channels for education in South Carolina.

SOUTH DAKOTA

South Dakota is another of the large states with a small, scattered population. It has no large centers of population, and only two areas in which the population could be considered to approximate 50,000. An estimated 98% of the total state population is in very small towns or in completely rural areas.

South Dakota has 13 four-year colleges and universities and 2 two-year colleges, with a combined enrollment of approximately 14,000. Public school enrollment is approximately 144,000.

South Dakota has four educational television reservations, two VHF channels and two UHF channels. None had been activated at the time of this survey, but Channel 2 at the University of South Dakota in Vermillion has since gone on the air. A tentative agreement to participate in the Upper Midwest Six-State Educational Television Network exists.

The largest community -- Sioux Falls, in the extreme eastern part of the state -- has an unused reserved channel in the UHF band. Survey consultants learned that there has been recent discussion of the possibility of activating this channel. Meanwhile, the public school system of Sioux Falls has been using some early morning broadcasts on a commercial outlet.

Dr. M.F. Coddington, State Superintendent of Public Instruction, writes:

> "South Dakota is a rural state with few communities which are large enough to support an educational television station. For this reason little progress has been made in this field. We need educational television to supplement the rather limited instruction which is now available in many of our schools. We think that our only hope for adequate educational television coverage will be by means of a state-wide network. We are interested in the proposed Upper Midwest Six-State Educational Television Network. The 1961 Legislature in South Dakota adopted a resolution requesting the State Legislative Reserarch Council to make a study of educational television and especially the proposed network. We believe that sufficient channels should be reserved for South Dakota to establish the proposed network."

Mrs. Preston Scott, State President of the South Dakota Congress of Parent-Teacher Associations, says:

> "We have a greater need in South Dakota than some of the more populous areas because of the extreme distances, and we will always have some small school systems where the curriculum will be limited. Teacher preparation in South Dakota is not comparable to that obtainable in the larger systems. For the same reasons the entire population would benefit greatly by having informational, cultural programming available on Television. Even now the public school systems of Rapid City as well as the University of South Dakota, Augustana College, Northern State Teachers College, and Dakota Wesylan University are cooperating in an effort to develop educational television. In the past ten years, the cost of education in the public school systems of South Dakota has doubled, and the anticipation is that this will happen again in the next decade. Means are going to have to be found to provide the best education possible. This is not due to primarily an increase in enrollment but in rising costs of living."

Coupling the newly evinced interest in the legislature with the efforts being made in the State Department of Education and in the institutions of higher learning, it can reasonably be inferred that educational television will be developed on a state-wide system within the next few years.

The survey reflected need for a VHF channel in the western part of the state in the vicinity of Rapid City, with some low-power UHF stations to take care of repeats in places like Mitchell and other small centers. On this basis there is justification for at least 10 additional channels for South Dakota's future educational needs.

TENNESSEE

Tennessee has four areas of over 100,000 population and five of 50,000 or more distributed evenly across the state. It has 33 institutions of higher learning with an enrollment of approximately 54,000. Ten of the institutions are located in Nashville and seven in Memphis. The large state university is at Knoxville. The public school enrollment is nearly 800,000.

Extension teaching by television is carried on and one station, WKNO-TV is in operation at Memphis. A state commission for the exploration of the possible uses of television also administers a state appropriation of $50,000 annual operating funds for each community that has an educational television station. Up to now only Channel 10 in Memphis has used the fund, but the Nashville and the Davidson County schools report progress toward activating Channel 2 in Nashville.

Chattanooga, Nashville, Knoxville, and Memphis all have regularly scheduled classroom lessons by television, utilizing the commercial stations in all cities except Memphis.

The State Commission had an engineering survey made in 1953 which resulted in the reservation of eight channels for education in the state. Four are VHF and four are UHF channels, but two of the VHF reservations are in isolated areas and could be used only as satellite or relay stations.

Knoxville and Chattanooga, third and fourth largest Tennessee cities, have UHF reservations. This has retarded activation in those cities. But recently interest has quickened, the survey learned, and both cities expect to make progress during 1961 and 1962 toward activation of channels.

At the present time, the Tennessee Educational Television Commission is active in administering the operating funds for Channel 10 in Memphis, and in acting as a coordinating agency for all efforts in the state. Channel 10 in Memphis is operating regularly, but the survey found no plan for, and only casual interest in, an additional reservation for that area at this time. Efforts, apparently successful, are being made to activate Channel 2 in Nashville, but the survey found little interest for an additional channel or expanded services. Chattanooga, through the city schools, is offering three courses each week to elementary school pupils. Interest in activating Channel 56 is strong, and a formal tri-state organization has recently been established to further this effort.

Knoxville has a metropolitan educational television council, organized by the University of Tennessee, which is producing seven and one half hours of classroom teaching each week. The membership of the council will be expanded next year and will begin efforts to activate Channel 20 in that city.

Educational leaders in Tennessee generally agree that one more reservation is needed between Knoxville and Chattanooga, and that each of the four major metropolitan areas will need at least two stations on the air within ten years if it hopes to offer any kind of adequate curicula for the various grade levels of school and college. This would mean at least five additional reservations for Tennessee.

Dr. Joe Morgan, the State Commissioner of Education, writes:

> "There will be a need for expansion of television facilities which will increase the next ten years. The success of the educational television station in Memphis and the results of experimentation in a pilot situation in Tennessee schools and colleges has demonstrated the value of educational television and will insure its expansion in the future. There is a definite plan to extend the use of broadcast television and television channels should be reserved in sufficient numbers to meet the needs of the future in Tennessee."

With the continuing encouragement of the state legislature and the indicated development in Nashville, Knoxville, and Chattanooga and the other smaller centers, it is evident that the full use of instructional television will require multiple channels for in-school programming, as well as for the use of higher education, and in extension programming for the general public. On this basis, and projecting the total information received from data sources in Tennessee (including recognition of a need in the Bristol-Johnson City area, in the area between Knoxville and Chattanooga, and in the central-western portion of the state), at least 17 additional channels will be needed in Tennessee.

TEXAS

Texas has 12 centers of population of over 100,000 and 12 smaller centers of over 50,000. Most of the population is concentrated in the eastern half of the state, and the bulk of it is located in the metropolitan areas. These areas run in a line from north to south, from Wichita Falls through Fort Worth, Dallas, Austin, San Antonio, down to the Corpus Christi area on the Gulf.

Texas has 56 institutions of higher learning with a total enrollment of approximately 133,000 and a public school enrollment of more than 2,000,000.

Eighteen television channels are reserved for education in Texas. Three of these channels have been activated and a fourth, in the San Marcos area between San Antonio and Austin, is now in the process of being activated.

Dr. Lee Wilborn, Assistant Commissioner of Education for Texas, writes:

> 'Our needs for educational television service in the next ten years are much stronger than I have indicated in the formal response to your questions. School Superintendents throughout our state are planning for some type of television service in almost all meetings I attend. For example, in Denison the school administrators of that section of our state were having a meeting with Channel 13 representatives from Dallas planning to microwave the Channel 13 educational programs into the north-central section of the state.
>
> "When our new station, Channel 9, goes on the air in the Austin-San Antonio area, we have already had approaches from superintendents in the Laredo area asking that we microwave our programs to them. In this central Texas area round Channel 9 we will have 13 colleges and universities along with 26 public schools in the coverage area."

Dr. Wilborn also said that overcrowded classrooms throughout the state, three to four thousand qualified teachers lacking each year, and an urgency to share outstanding teachers and professors are some of the problems that could be vastly improved by the use of broadcast television. He says most local school officials confirm this feeling and most new school buildings are prepared for television reception.

The University of Corpus Christi says:

> "At the present time we do have situations in our curriculum and our facilities which would be greatly helped by the use of broadcast telesion. It is for this reason that we are definitely interested in the possibility of educational television for Corpus Christi and that we are pursuing our agreement with the Corpus Christi Caller-Times and joining in their application for television Channel 3. We also see definite future needs caused by increased enrollments and facility shortages which can be met by the use of boradcast television. We believe very definitely that television space should be reserved for the future use of the University of Corpus Christi, and for the institutions in South Texas.

Dr. A. B. Martin, President of Amarillo College, writes:

> "We are using closed-circuit television on our campus. We have a television studio equipped with two vidacon camera chains and the necessary equipment; in addition, we have a microwave outlet to Channel 10 here in Amarillo. Each morning we are broadcasting a televised credit course on a program known as Sunrise Classroom. We are looking to broadcast television to aid in the development of our adult and evening college programs. Broadcast television would

also help us to serve the increased enrollment we expect, and to make effective present instructional techniques to larger groups."

The University of Houston issued the following statement:

"In addition to our own college courses, KUHT has brought to Houston the most comprehensive adult education program that has ever been achieved here by any means. Recently, the public schools entered the picture with substantial time requirements in potential conflict with our needs at the University. Each of these three activities will need a separate channel in the very near future, and by the time any actions can be taken two of them will need more than one channel.

"It is our firm belief that the greatest single aid to education within the power of the Federal government would be the reservation of a considerable section of the television broadcast spectrum, probably more than anyone is thinking about at this time. At this time of re-appraisal and perhaps expansion of the channel pattern, it is vital to the states and to the nation that the term 'public interest' be brought back into its intended vigor from the desuetude into which it has lapsed during the 35 years of commercial broadcasting. True public interest calls for the federal government to reserve the potential for multiple-channel public communications in all areas of even moderate population density."

Dr. L. D. Haskew, Vice Chancellor of the University of Texas, in referring to the need for potential multiple channels, writes:

"The expansion of in-school and in-college broadcasts is dependent upon the development of proven materials. Materials may be video-tapes; they may be teachers who have produced an effective format and technique for presentation of a given subject. When such 'material' appears it is rapidly used either by reproduction, or imitation or adaptation. Witness the rapid increase in the number of educational television stations carrying instruction in foreign language, in chemistry, etc.

"Now, every time a subject is developed to the point where telecast seems profitable, a thirty minute or one hour slice of a channel is tied up for that one subject. In effect, then, when fourth grades of a broadcast area are receiving arithmetic, no one else in the area can receive anything else. As 'materials' increase in number and variety, the pressure for simultaneous channels will mount and mount. In fact, unless they can mount, the school systems and colleges will be increasingly reluctant to stake much of their success on televised instruction. Certainly, we have a parallel in closed-circuit use at the college level. At our main University, for example, we already need triple channels. At our dental branch, twin channels are hardly enough to carry what we have already, and other subjects are standing in line to get on the network."

R. F. Schenkkan, Director of Television at the University of Texas, writes:

> "We believe that by the use of broadcast television, which will be available to use in January 1962, we may serve a very useful purpose in providing better preparation in such areas as English and Mathematics for students about to enter the University. However, we feel that broadcast television may serve the community more usefully in the areas of elementary, secondary and general education. We feel that television channel space should be preserved for the future use of the educational institutions in our area. Indeed, it is our conviction that the single VHF channel now available to the San Antonio-Austin area will not be adequate in the years to come for all needs. UHF reservations need to be continued."

In the general survey, the school systems in Texas responding indicated that 75% of them were either using broadcast television, or planning to use it, to meet instructional needs. In the area of higher education, of 27 colleges and universities responding, three indicated that they were now using broadcast television, nine that they plan to use it, and 25 said that they could see future needs for television in their institutions.

In projecting a minimum number of additional channels potentially needed in Texas, serious consideration must be given the great distances to be covered and the sparse population in certain areas of the state, and to demonstrated local needs.

In Alpine, Texas, for instance, the state teacher training institution indicated it has a real and serious problem in providing in-service teacher training for its very widely acattered school systems in that area of west Texas. A channel needs to be provided for the Alpine area for the future. Odessa and Midland are in somewhat similar situation. San Angelo does not now use its reserved channel, but if the needs of the area are served, it will be used in the future, and an additional channel needed. Abilene has no reservation, yet both the Abilene and Sweet Water areas have particular problems of scattered population.

If the presently developing, cooperatively interlocked, educational television system in Texas prevails; if the reserved channels in north and west Texas and the Panhandle are activated as anticipated; then in the light of the State University and University of Houston indications, all of these channels will have to be at least doubled for in-school service and the collateral services which will be demanded. On this basis, a minimum of 52 additional channels for future use in Texas is a conservative projection.

UTAH

Utah has three large population centers in the north-central portion of the state, practically adjoining one another, and very little population elsewhere. It has four four-year colleges and universities and three two-year colleges with a combined enrollment of approximately 31,000. Its public school enrollment is approximately 215,000. At present Utah has four reserved channels. They are Channel 46 in Logan, Channel 18 in

Ogden (now operated by the Weaver County Schools), Challen 29 in Provo, and Channel 7 in Salt Lake City (now operated by the University of Utah).

Utah State University in Logan has purchased from commercial interests the construction permit for Channel 12 in Logan and intends to activate it. Brigham Young University in Provo has indicated that it will probably try to have Channel 11 in Provo changed to a reserved channel. This indicates that the four communities with reservations in Utah soon will be served. However, vast areas of the state remain unserved. Unfortunately, population is sparse and scattered throughout the eastern and southern part of the state. These people need educational television coverage more than do those in urban districts. A combination of microwave and translators in the communities of Sprice, Roosevelt, Vernal, Richfield, Cedar City, St. George, Moab, Landing, Panguitch, Delta, and Fillmore would provide them the best coverage.

The survey found great interest in a state-wide dual channel facility. The people in Utah feel that they should broaden the number of channels authorized for translators in the UHF band. There is also great interest in the multiple channel operation at the University of Utah where Channels 71 and 74 are to be operated as standard broadcast stations even though they are only operating on 10 watts of power. Experience has been that where the low-power channels have been operated by competent engineers, the units have put out an excellent quality signal.

Enlarging the block now reserved for translators with a special group set aside for educational use would meet much of the state-wide problem. Operational costs could be sustained by the counties.

Dr. H. Grant Vest, Director of the Utah Coordinating Council of Higher Education, writes:

> "The Coordination Council of Higher Education anticipates an increased need for channel space and for extensive state-wide planning for educational television in Utah. In discussion of this matter in connection with budget requests via the institutions of higher learning, prior to the meeting of the 34th Legislature in January, 1961, the Council noted that the system of higher education in Utah will have to establish many innovations in order to bring high quality, low cost, college level training in the volume and diversity anticipated years ahead. The Council regards educational television as one practical innovation that may help achieve these goals of higher education. Educational television is also a vital means through which the higher institutions may serve the elementary and secondary schools and the people of the state. No doubt, it will take a considerable time to develop plans for looking toward the establishment of a state-wide educational television network linking all the educational television units into a common program. There ought to be state level coordination, within a program of state regulations and continuous planning. The institutions of higher education, and certain strategically

located school districts can operate their separate systems on a co-operative basis."

Dr. Daryl Chase, President of Utah State University at Logan, writes:

"At present we have the construction permit for VHF Channel 12. UHF Channel 46 also is, at present assigned as an educational reservation for our area. These two channels, it appears, should meet our immediate needs, so far as channel allocations are concerned. In future planning it would seem that we here at Utah State University must look in two directions: 1. The increasing use of television in instruction and teaching, and 2. The utilization of television for extending our adult extension education programs.

"In regard to the first mentioned, expanding enrollments suggest that the most serious consideration must be given to the possibilities of television meeting the problems of teaching, and increasing numbers of students within limited numbers of classrooms and laboratories, and with limited numbers of faculties. Educational television's potential limit for heightening and extending the quality, as well as its assistance in meeting the demands of quantity of education is likewise considered significant. Observation of the experiment at the University of Utah in which UHF systems are being employed for distributing the instructional materials suggest that possibly two or three additional UHF channels could eventually be utilized for education in this area.

"Our second major consideration centers about the responsibility of land-grant universities for carrying educational information to the citizens of the state. This suggests then, the need for additional VHF channels for education. For the present at least, VHF is the only feasible means for reaching the public over great distances through the television medium, land-grant institutions should have access to VHF stations distributed about the state in such a fashion as to give coverage to most of the state's population. A series of microwave channels to link such stations together would be an accompanying necessity. Our estimate is that a network of seven VHF stations linked together could serve the needs of essentially all of Utah's population. At present VHF channel allocations are being utilized for education only in Salt Lake City. In addition there are commercial VHF channel allocations for which commercial utilization does not appear imminent and which could possibly be used educationally in the state network in the following: Logan, Channel 12 (CP - already in possession of the Utah State University); Cedar City - Channel 5; Price - Channel 6; Provo - Channel 11; Richfield - Channel 13, Vernal - Channel 3. We have already proposed to the Utah Educational Television Foundation that these channels be utilized and linked into an educational network to serve the state of Utah for adult education and extension generally and for such in-school needs as confront the local districts in each area."

Dr. Wilbur N. Vall, State Superintendent of Public Instruction of Utah, says that the ultimate objective of the State Department of Education for in-school television is a state-wide coverage through all of the multiple television systems that can accommodate the varying needs of individual districts and permit them some selection. Dr. Vall says also that there is a rather strong argument favoring the extension of television instruction coverage into small counties. The science, mathematics, social studies, and foreign language programs, especially at the elementary levels, can be greatly enriched through educational television. He says some small school programs in outlying areas are at present inadequate. He points out that with a multi-channel television system, the educational system could rebroadcast the programs and materials in many combinations and at varying times, and so more efficiently and satisfactorily serve the specific needs of autonomous school districts. Dr. Vall suggests that there are 11 areas which should specifically be served with multiple television broadcast facilities and his selections are approximately the same as those made by the coordinating council and the institutions of higher learning.

Cedar City is one of Utah's most isolated communities in relation to major population areas of the state. Mr. Ianthus Wright, Superintendent of the Iron County School District, which centers in Cedar City, writes:

> "For several years we have been interested in educational television, even though at present there is no channel into our school district. Our interest has been great enough that we have sent delegates of parents, school board members, and teachers into Utah, and surrounding states, where we have learned that good educational television programs are in existence. As a result of these studies we feel that there are tremendous possibilities of improving our curriculum by the use of educational television, particularly so in the small schools of this rural area. At the present time we have on the planning board a new high school for Cedar City and have planned facilities to take care of television when it comes. We urge that sufficient television channels be reserved for rural areas of Utah in order that they may take advantage of these educational facilities."

This same type of communication was received from six other rural counties in Utah.

Assessment of the information, experience, and projection of planning in Utah, shows need for VHF channel reservations in Cedar City, Price, Provo, Richfield, and Vernal. These communities already have VHF channel allocations which are unreserved. The need is to reserve these for educational purposes in these areas to establish a prime state system of educational broadcasting. In addition to this need, and for the projected multiple channel needs, a minimum of 24 additional UHF channels will be required for Utah.

VERMONT

Vermont, a relatively small state, has only two centers with a population in excess of 50,000. It has 18 colleges and universities with a total enrollment of approximately 9,000, and a public school enrollment of approximately 70,000. There is one UHF channel, in Burlington, reserved for educational purposes.

Dr. A. John Holden, Jr., Commissioner of Education, says:

> "We have instructional needs which could be satisfied or enlarged by the use of broadcast television in such subjects as art, music, elementary science for schools and rural areas where special teachers are unavailable; advanced high school subjects such as art, mathematics, economics, especially for small schools and rural communities. There is need for programs for teachers, especially in the new mathematics and modern foreign languages for elementary teachers. We already have a severe shortage of teachers, especially in foreign language, mathematics, and science. We believe the national demand for teachers in these areas will create a more acute shortage in rural communities of the future. There will be an increasing need for the reeducation and extended education of adults as automation and mechanization increase. As our present civilization becomes more complicated and the problems of international relations become more complex, the need of expanded programs of information and education will be imperative. Educational television is one medium that will assist in meeting these needs, and sufficient channels should be reserved to provide for such needs. The University of Vermont has a grant for a survey of the educational television needs of the state to activate one or more stations for Vermont. Our future extension will depend upon the results of this survey."

The University of Vermont reports it is now using closed-circuit operation in the medical college. In addition, it broadcasts regular programs on the local commercial station. These include a daily agriculture program, and at least one course for college credit. Under a Ford Foundation grant, the University is surveying the state and developing a state plan for educational television. The University hopes to pick up Channel 16, which is reserved for education in Burlington, and to operate it for the benefit of the educational institutions in the area.

With this information, and on the basis of the engineering survey, a comparative projection indicates a minimum need of seven additional channels for education in Vermont, and possibly the additional use of 6 - 10 low-power translators.

VIRGINIA

Virginia has four large centers of population of over 100,000 and six areas of population over 50,000. It has 43 institutions of higher learning, serving approximately

54,000 students, a number projected to increase by 1970 to 95,000. Public school enrollmentis approximately 800,000.

In 1959, the Governor appointed a commission to study the feasibility of educational television. Members of this commission recommended a budget of $250,000 to establish the commission with a director and a professional staff:

> "To provide matching funds to localities presenting course work via commercial stations; to develop programs for state-wide distribution; to proceed with engineering studies of alternative educational television systems; to employ television teachers; to assist state institutions in planning and teacher training for the utilization of the medium; to accept, expend, and allocate funds and equipment from public and private sources for use in an educational television network for the state."

The commission's work was successful to the extent that its recommendations were approved by the State Senate unanimously and by the House of Delegates, with only four dissenting votes. The educational television bill was not approved by the governor because of legislative action which resulted in the demise of a 3% sales tax from which the educational television appropriations were to be derived. The term of the commission expired with the failure of approval of the legislation by the governor.

At the present time in Virginia there is no central state authority. There are groups representing a large potential for the future:

1. In Richmond, Superintendent W. I. Willis, of the Richmond public schools, is spearheading an effort to establish a station in that area. Superintendents in the surrounding counties have agreed to a $1 per pupil funding system. Some funds are reported on hand and other capital funds in prospect, apparently sufficient to lend promise of success for the start of a station in Richmond, survey consultants were told.

2. The College of William and Mary (which includes the College of William and Mary in Williamsburg, Richmond Professional Institute in Richmond, and Norfolk Division, and two new junior colleges) is developing a video-tape exchange system with closed-circuit television installations on each campus. The video-tape recorder and central production studios will be on the Williamsburg campus. The College of William and Mary, with five campuses distributed through the Tidewater area of Virginia from Richmond to Norfolk, has the potential to serve as a pilot network for the state.

3. Virginia Polytechnic Institute is interested in network arrangements for the southwest Virginia and for a means of interconnecting its junior colleges and extension center, and reaching into mountain communities.

4. Norfolk Public Schools in cooperation with adjacent county and city school systems in the Hampton Roads-Chesapeake Bay area have activated a station on Channel 15 to serve the schools and communities of that area.

5. Virginia Educational Television, Inc., a lay-group of interested civic leaders, legislators, and educators, while lacking the authority of an appointed commission, has potential strength to guide action.

Information derived from these sources reflects the great interest Virginia has in educational television. The University of Virginia during the summer of 1961 had a workshop in the Hampton Roads area to orient teachers in the surrounding school systems to classroom utilization of television. Considerable interest is evidenced in the Arlington-Alexandria area in the establishment of the school station in Washington, D. C. through the Greater Washington Educational Television Association (GWETA).

Dr. Woodrow Wilkerson, State Superintendent of Public Instruction, says:

> "We see a growing interest in Virginia in the use of television for instructional and educational purposes. This year 224 districts report participation in educational television compared to approximately 150 last year. 39 subjects are being offered compared to approximately 24 last year. Television is being used primarily for supplemental, motivation, and enrichment."

Virginia is getting a dual start in instructional television in the Norfolk-Hampton Roads and Alexandria-Arlington areas. Indications are, considering the needs of the rural areas, especially those in the central and western parts of the state, that the rest of the state will follow suit with state level support. Information received from the schools and the institutions of higher learning, dependent upon the financial feasibility of such service being made available to them, affords a basis for projecting a minimum need for educational channels. Contemplating the multiple channel needs for instructional purposes that are becoming evident in the eastern part of the state, and proper service to the Richmond area and the smaller communities and rural areas, a minimum of 22 additional channels will be required in Virginia to serve the needs of education.

WASHINGTON

Washington has six large centers with population of over 100,000 and six small centers with population of over 50,000. It has 24 four-year colleges and universities and nine two-year colleges with a total enrollment of approximately 60,000. Its public school enrollment is approximately 570,000.

Washington has nine channels reserved for education which have not yet been activated, and two stations on the air -- Channel 9 in Seattle, (operated by the University of Washington), and Channel 56 in Tacoma (operated by the public schools).

Despite difficulty in television transmission between the western part of the state where the bulk of the population lies, and the eastern areas, plans for state-wide television for educational television to the extent that it is feasible are reported. However, the survey found no organized state plan nor unanimity of opinion as to how educational television should expand in the state.

Channel 9 looks forward to the extension of its services by way of translators, cable, and community antenna systems, to towns in the west-central part of the state, and perhaps even into the western part of the state.

The Washington Educational Television Association has no clearly defined pattern for extending educational television throughout the state. One sentiment that survey consultants discovered commonly among people engaged in education in the community was that two low-power UHF channels should be reserved for each college, junior college, and major school district.

The areas of population not now provided for in the educational reservations that need to be included in any new system of allocations are: Bellingham, Olympia, Aberdeen, Odessa-Moses Lake Ephrate, Centralia-Chahalis, Longview-Kelso, Everett, Mt. Vernon and Port Angeles.

Four institutions of higher learning, aside from the University of Seattle, expect soon to initiate educational television service. They are Washington State University at Pullman, Western Washington College at Bellingham, Central Washington at Ellensburg, and Eastern Washington College at Cheney. Establishment of a number of new junior colleges at locations not yet designated is expected in the years immediately ahead.

Channel 62 in the Tacoma area is expected to go on the air shortly and will duplicate in-school broadcasts and community coverage in this area.

Dr. Lewis Bruno, State Superintendent of Public Instruction of Washington, writes:

> "We see educational television as providing a major resource in nearly all curriculum areas and up-grading the instructional program. It is especially valuable in science, the social studies, literature, music and art, as well as the foreign languages. Another valuable contribution is in the field of in-service training of teachers. In our opinion, television will continue to play an increasing role in education. Our rapidly accelerating technology continues to result in changes, both in the content and in the organization of content. Television can effectively bring these new materials and new structures of disciplines into our classrooms. Broadcast television is being rapidly extended in our state to stations which are being planned, and translators are being installed with cable hook-ups. As the contributions of the areas are becoming better understood, the demands for facilities are increasing, and we feel that it would be a mistake not to reserve sufficient channels to meet the educational needs of the future."

Mr. Marvin J. Schroeder, Superintendent of the Ellensburg Public Schools, said:

> "Our system is most interested in the possibilities of classroom television to enrich teaching programs. I see the use of television as a means of putting into practice the concept of team teaching. To fail to anticipate the use of television and to make those provisions now which will permit us development in the years ahead would be a gross error."

The above expressions are typical of those which were received from Washington school superintendents. There was no dissent on the usefulness, and the need for instructional television in their systems, and particularly in the years immediately ahead. Some of the smaller school districts indicated that, lacking any experience with television and lacking time to investigate it thoroughly, they had done little toward promoting it. This attitude generally was confined to those areas which have had no contact with either general educational or instructional television.

Survey data from the schools, the universities, and the Washington Educational Television Association indicate that the development of state-wide television which will serve all of these school districts and all of the institutions of higher learning in Washington will not be rapid. The first development will follow those already established on the east coast. The extension of the university program, by microwave and cable to translator systems, into the central and eastern parts of the state could come before further extension of the broadcast channels. But equally indications are that however slow, the development is inevitable, and the general sentiment expressed by respondents was that the state should be prepared to meet the demand when it arises.

On the basis of the information received in the survey from various sources, and compiling the needs indicated by the schools, the colleges, the communities, and the Washington Educational Television Association, Washington will need a minimum of 36 additional channels for educational and instructional television service within the next 10 to 15 years.

WEST VIRGINIA

A number of problems in relation to educational television as well as in relation to education occur in West Virginia.

West Virginia is one of the few states which has lost a significant share, more than 7%, of its population during the last 10 years. It has two centers of population of over 100,000, but 75% of its population lives in small towns and rural areas.

West Virginia has 17 colleges and universities with a total enrollment of approximately 26,000. Its public school enrollment is approximately 450,000. It has four television channels reserved for education, counting Channel 57 which was jointly assigned to Wheeling and Steubenville, Ohio. None of the channels has yet been activated.

The survey found little concern in the area of higher education with broadcast television in West Virginia. The University of West Virginia, at Morgantown, is not contemplating establishment of its own station. It did report that several areas of the University have indicated a strong desire to make use of television as a teaching tool.

A group of six West Virginia colleges in the north, together with the University, are members of the West Virginia Area Educational Television Committee. This group is working toward a cooperative television course or courses for credit programs on all seven of the campuses.

Concord College in Athens expressed interest in television. The new Fine Arts Building there is being planned with television studio facilities. Survey consultants were told that in the general area of Concord College there are many poorly prepared elementary school teachers who could take needed courses if they were offered by broadcast television. For a variety of reasons, many of these people are unable to take courses by normal extension methods, or during summer sessions. Because of this Concord College feels that broadcast television through its institution would improve the quality of education in the general service areas.

Marshall College, in Huntington, has under consideration the possibility of creating some two-year branches in other parts of the state. The Dean of Applied Science there feels that broadcast television offered a possibility of teaching some of the courses at these cities some distance from Huntington, and so improve instruction as well as make it available to more students. Marshall College is particularly concerned that reservations in West Virginia are all in the UHF area, and the mountainous terrain is a tremendous handicap to them. Some feeling was expressed that multiplicity of low-power channels might overcome the handicap in some instances.

Shepards College at Shepardstown indicated it is looking toward a future in which it might be able to afford television facilities and broadcast television for in-school, on-campus and extension of college services.

Dr. John R. St. Clair, former State Superintendent of Public Instruction of West Virginia, believes that broadcast television can add to the general enrichment of all areas of curriculum, and can overcome present curriculum deficiencies. He also indicates the great need for the continuing in-service training of teachers. Dr. St. Clair believes it essential that West Virginia establish a legal authority to develop educational television. He says this might be accomplished by developing an interest in connection with the centennial year of West Virginia, for which activities are now being organized for 1964. He emphasizes that there is a need for many more VHF channel reservations for education in West Virginia, a need heightened by West Virginia's rough terrain.

The survey evidenced that much thinking but little action concerning educational and instructional television has taken place in West Virginia. It would be difficult, on the basis of a declining population and economic situation alone to make any projection of the state's future needs. But in examining the relationship of the present reservations to the population and to the general geographical area of the state, some projecting can be accomplished.

There are two reservations in the extreme northern part of the state, including the one in conjunction with Steubenville, Ohio. The other two are in the extreme southeastern part of the state. In view of the fact that 75 per cent of the population lives elsewhere there will need to be provided many additional UHF channels that could be used as low-power translators or statellite stations, if these people are to have the benefits of educational and instructional television.

More than a dozen such areas in the state would ordinarily be handicapped in receiving any long-range broadcasts but could use fairly low-power local stations, probably interconnected with either cable or micro-wave links.

It is difficult also to project into multiple use of channels. It can be said that a state-wide service of low-power stations, if made available, will need more than one channel.

The best projection is one based on needs observed during the survey and on an engineering survey. On this basis West Virginia will require at least 24 additional channels for its future educational television requirements.

WISCONSIN

In the southeastern part of Wisconsin there are seven large population centers of 100,000, and seven small centers of over 50,000. Scattered through the center part of the state are four additional small centers with population over 50,000.

Wisconsin has 34 four-year colleges and universities and three two-year colleges with a combined enrollment of approximately 69,000. Its public school enrollment is approximately 680,000. Wisconsin has two educational television channels on the air-Channel 10 in Milwaukee and Channel 21 at the University of Madison. It has 11 more channels reserved for education, but not yet activated. All these are in the UHF band. Channel 36 in Milwaukee has been added to the reserved list as a second channel, at the request of the Milwaukee schools. Survey consultants were told this channel will soon be activated.

Wisconsin, in the past, has taken the lead in educational broadcasting, and through the state council an effort was made in the early days of television to duplicate its radio network with an educational television network. Up to now legislative support needed to provide funds and authority for such an educational television network has not been forthcoming. In the meantime, the development and experiment action on all levels of education are continuing.

The University of Wisconsin at Madison reports:

> "The University of Wisconsin operates WHA-TV (Channel 21) for the purpose of experimentation, research, and program development. We broadcast 20 hours per week, approximately, with a schedule that includes both in-school and general adult education. At the present time experimentation with formal University course instruction is conducted on a closed-circuit basis. In the past, however, credit instruction has been offered through broadcast television and will be again in the future.
>
> "The University proposes during the next biennium to:
>
> 1. Increase the coverage of Channel 21 through the relocation of the tower and increasing power.
>
> 2. Establish a micro-wave link with educational television Channel 10 in Milwaukee.
>
> "We foresee the need in the future for the allocation of additional educational television channels to provide for the inter-linking and reception between the Madison campus and the University of Wisconsin at Milwaukee, and extension centers and state colleges throughout the state. In view of increasing schedule pressures on existing television channels in Wisconsin, it appears necessary in the long range to provide for educational channels in addition to those already in operation or reserved."

The Coordinating Committee for Higher Education in Wisconsin is responsible for development of a long-range plan for higher education in the state. A subcommittee of that group includes in its deliberations the usefulness of television in long-range planning. Dr. L. H. Adolfson, Dean of the University Extension Division and Chairman of the Joint Staff Committee on Educational Television for the coordinating committee for higher education in Wisconsin, says:

> "Through the experience of channels in Madison and Milwaukee, it has already been established that television has served well the instructional purposes of educational agencies in a variety of ways and at all instructional levels. With the increasing demand for educational opportunity manifest in mounting enrollments and a growing interest in adult education, we feel certain that television will continue to have continuing utility as an instrument of education.
>
> "In Wisconsin, we anticipate particularly the future needs to provide for the sharing of educational resources through the inter-linking of the Madison campus with the University of Wisconsin at Milwaukee, and with the extension centers and state colleges throughout the state. To accomplish this, it is our conviction that the best possible television channels must be made available to the forces of education.

Dr. G. E. Watson, State Superintendent of Public Instruction, writes:

> "Smaller and rural school districts cannot provide diversity, quality, and specialization of instruction that is available in more populous, favored and wealthy districts. These needs could, in part, be met by broadcast television. Certainly there could be improvement. As scope of knowledge increases and amount of training increases, needs for increased and improved instruction will increase. As school district organizations accelerate, and other instructional media are utilized, the need for television will be restrained. At the present time, there is no planning for the extension of broadcast television in Wisconsin by the one body capable of implementing and planning, namely the State Legislature. I believe that the television channels should be reserved in sufficient numbers for education to provide for future needs."

The Milwaukee Public Schools report that one of the greatest restrictions of television for instructional purposes is the limited channel allocations. The Director of the Television Department of the Milwaukee Schools says that he envisions a need for 6 to 12 channels in the Milwaukee area to enable television to reach its full potential of instruction there.

Both Dr. Harold S. Vincent, Superintendent of Milwaukee Schools, and Dr. Dwight Peel, Assistant Superintendent in Charge of Instruction, support this position, Dr. Vincent says:

> "We are finding the television medium an effective tool of instruction and anticipate that its use will continue to expand in the future. We strongly urge that an adequate spectrum space be allocated for educational purposes so that the maximum use of the television medium can be reached in the field of education."

Dr. Peel says:

> "The use of television in the regular instructional and supervisory programs of the Milwaukee Public Schools is providing an exceptionally valuable service in terms of enhancing the quality of instructional programs and making possible certain curriculum offerings which otherwise would not be possible.
>
> "Since 1957 our schools have made a careful study of the effectiveness of television in both our instructional and supervisory program. The results of our study have caused us to modify and expand the use of television from year to year. Next year, for example, we anticipate using approximately 750 telecasts. Presently, approximately 50,000 pupils in our schools receive some instruction via television; all our teachers receive some supervision by television. This latter provision enables

> our supervisory staff to serve many more teachers than they could possibly do by conventional procedures alone -- to mention only one advantage of television.
>
> "In the interest of public education, I would strongly urge that adequate spectrum space be allocated for educational television to enable schools to advance in their use of this medium."

Monsignor Edmond J. Goebel, Superintendent of Schools of the Archdiocese of Milwaukee, says:

> "Our Catholic schools in Milwaukee have an enrollment of 94,246 in the elementary grades and 14,000 in the high schools. We have requested more time on the educational television station, but station WMVS-TV does not have additional time available to serve our children properly. We must offer more broadcasts."

In the general survey 90% of the schools responding from Wisconsin indicated they either were using broadcast television, or had definite instructional needs which could be met by the use of broadcast television if it were available to them.

The Superintendent of Public Instruction was not optimistic about the implementing of state plans, or rather implementing the plans for a state network of educational television. But survey responses indicate needs in Wisconsin are pressing toward increased use of broadcast television on all levels of education. If state-wide educational and instructional television is accomplished in Wisconsin, and if the needs found evident in Milwaukee and Madison are projected, the future educational service in Wisconsin will need a minimum of 36 additional channels.

WYOMING

Wyoming has no large centers of population. In only one area does the population total as much as 50,000. It has five colleges and universities with a total enrollment of approximately 6,700. Its public school enrollment is approximately 75,000.

Wyoming has one educational television reservation, at Laramie in the southeast. This is a VHF channel. It has not yet been activated.

The University of Wyoming at Laramie is apprehensive that commercial interest will try to take the Channel 8 reservation away from education. It vigorously opposes such action. The Executive Assistant to the President, H. W. Benn, writes:

> "Wyoming needs educational television. With our sparse and scattered population, the use of this medium is particularly important in providing

educational opportunities for the general public and in supplementing the instructional programs of our schools and junior colleges. Statewide multiple channel broadcasting is needed and there is a definite possibility that television teaching for our university students is also needed. The following information is presented as evidence of the University's effort to initiate educational television:

1. A committee has developed plans for a television project. A very detailed study has been made of the facilities, equipments, and personnel which would be needed. Numerous reports and other publications were reviewed and some television stations were visited, and a consultant was brought in to survey facilities and make a recommendations.

2. Some of the foundations have been contacted relative to the possibility of donating equipment or providing grants to use in starting a station.

3. A community television system recently contacted the University Board of Trustees relative to a cooperative project on educational television. These programs would be carried to many communities in Wyoming. The Board has expressed further interest in the matter and has authorized me to participate in the further investigation of the possibilities of bringing educational television to the people of Wyoming."

President Humphrey, of the University of Wyoming, has urged every effort be made to retain Channel 8 in Laramie. A reported request by a commercial company that Channel 8 be removed from Laramie to Terrytown, Nebraska, roused educational officials to prevent such a move.

Dr. Velma Linford, State Superintendent of Public Instruction for Wyoming, is an enthusiastic supporter of educational television. She says it is needed in the state for in-service teacher education, for curriculum enrichment, and in isolated elementary and secondary schools, for continuing higher education, and for vocational education for courses outside the schools. She feels these needs will increase during the next 10 years, and explains that the State Department of Education's only reason for inactivity in developing broadcast television has been lack of funds. Dr. Linford is convinced of the value of the medium, and urges that sufficient channels be reserved so that Wyoming can serve its sparsely populated areas where the need is greatest.

It is evident that the one channel in the southeastern part of the state cannot serve the sparsely settled rural areas of the state that need to bolster their educational facilities. To serve the needs determined by analysis of the general survey data and a study of the engineering survey, there should be an educational reservation at Casper in what is considered by many the state's most populous and prosperous area; another

around Sheridan, Rock Springs, and Powell; and others in some of the extreme western and extreme northeastern areas. At least 13 additional reservations should be made for Wyoming's future educational needs.

ANALYSIS AND RECOMMENDATIONS

The foregoing report emphasizes the scope of the problem in developing American educational facilities and opportunities to meet the demands of the "atomic-space" society which faces the immediate future of our people, and indicates in a significant measure the extent to which educational-instructional television must be involved in such development.

The statistical tables and engineering maps provide an index to our needs, to the resources available, and to the measurable deficiencies; however it is in the collective recorded recital of the professional experiences and informed opinion of the educational community that is found the real basis for understanding and for recommendations as to policies and procedures.

It is apparent from this indication that the deficiencies are many, and the need is great. It is also apparent that every tool must be used and every means explored to provide the facilities to improve instruction and cultural development qualitatively and quantitatively if the job is done that must be done.

In evaluating the projection of need for broadcast television channels in this report, it must be remembered that this projection in no way excludes the use of other media, or precludes the use of different methods of transmission. It is all of the same cloth. It is all important and essential, and in many instances inter-dependent. The projections made here are consonant with, and in addition to all other potentials of educational communication.

It is evident, however, that broadcast television can be a medium to provide opportunities and amplify resources in general education and systematic instruction that can be accomplished in no other way. And in spite of any technical developments which may result from experiments now under way, such as airborne transmission or satellite transmission, it seems fairly evident that the increasing needs of education must be met mainly by the use of standard television channels and land-based transmitters locally controlled and operated. Such control and operation are in keeping with the basic philosophy and tradition of the American educational system, and tends to bring into play all the varied aspects and resources of the different states and communities.

This is not to say that the developing long-range transmission systems, and the expanded number of frequencies which may become usable in some form have no place in educational or instructional television. They will undoubtedly play a very important part in some future needs; but the thing we are concerned with is the development and preservation and optimum use of the spectrum resources available to meet the indicated needs of the various states and localities in the next decade.

With this frame of reference, and an analysis of the information obtained in the general survey, and a study of the report of the engineers, certain recommendations are indicated:

1. Because the channel usages proposed in this report are based on a minimum, and future pressures and natural changes may establish different needs, the FCC should by policy, in addition to establishing further reservations of the recommended channels, give education equal consideration with any other service in any contest for a specific unreserved channel. This is particularly necessary when the channel in question is a primary channel for the educational-community service.

2. A primary educational television service with a wide coverage of a signal compatible with the receiving potential of each community is vital to a nation-wide system of instructional and general, informal education. In any revision of the rules or in any attempt at reallocation and assignment this should be a guiding principle of the FCC.

3. Because the minimum channel needs for education can not be obtained from the available spectrum under the present rules, education must oppose any plan to abandon any area of the VHF band. This report emphasizes the impossibility of meeting the requirements of education in the next decade with the frequencies of the UHF band alone.

4. The "Table of Availability" presented in this report is designed from the present table of allocations of the FCC, and many additional channels can probably be "dropped-in" in the various states. However such an effort was beyond the scope of this study. In order to fill the established need for channels beyond the availability indicated here, all educational institutions and agencies must be permitted to drop-in VHF channels where specific engineering indicates it is feasible and practical. This would require adapting rules governing spacing and directionalizing of antenna to the specific situation.

5. Further studies should be immediately and exhaustively made to discover possibilities of enlarging the service area of the present television spectrum, especially in the UHF band, and in view of the indicated need of multiple channels for education. The engineers have suggested the practical possibility of more than doubling the present number of available channels by using electronic computer methods in channel allocation studies. This suggestion should be pursued vigorously.

6. There are some localities where UHF can be used effectively for the primary educational-community service, if appropriate receivers are available and in general use; but in most instances UHF should serve the multi-channel needs for regular and specialized education, with the exception of some of the sparsely populated areas in the West, where it is essential to achieve wide coverage at minimum costs. Special consideration should be given to such areas.

7. This report shows that each community or educational complex using television for systematic instruction will need from two to twelve channels for simultaneous transmission. To assure the necessary placement and orientation of multi-channel service, the rules governing UHF allocations must be liberalized.

8. A careful plan of deintermixture is not only acceptable, but necessary in some areas; however, deintermixture should be planned by communities or individual service

areas, and should not be lumped into regional "zones" as it appears that such a system of allocation would be wasteful of frequencies, and work to the detriment of the educational services' need for and use of multiple channels.

9. Because of increasing evidence of cooperation among educational institutions in sharing instructional resources and the obvious need for such effort, consideration should be given to assigning additional frequencies to education for micro-wave links between closed-circuit systems.

10. In light of the various experiments now under way, additional * study should be made of special frequencies which might be used for extraterrestrial broadcasting for educational purposes, and possibly for specific data transmission.

11. Because of the increasing use of television in education, and because of the many different aspects and problems in the planning, construction, and operation of educational installations, the FCC should establish a department whose responsibilities would be devoted to the problems of educational broadcasting, and point to point transmission for educational purposes.

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*Arrangements are currently under discussion for a supplementary report to be prepared by NAEB on the potentials of satellite communications for education.

ENGINEERING REPORT

The Federal Communications Commission in its Sixth Report and Order issued in April, 1952, reserved a number of television channels for educational use. At present the Table of Assignments contains 275 channels in this category. Educators have been urged to define their needs for a nation-wide system which would require the addition of a number of channels to this reservation category. A state-by-state study has been made of such needs by the National Association of Educational Broadcasters and the locations in which channels are necessary for this purpose have been defined for engineering allocation study. The existing Table of Assignments has been used as a source of channel locations. Maps and tables have been prepared to show how educational needs could be met in part from the existing table.

The National Association of Educational Broadcasters has supplied 48 state maps defining locations of major school districts, universities, and communities of 50,000 population and above. First priority in the engineering portion of the study was given to supplementing the existing 275 reservations with additional channels to provide a nation-wide single service on an over-all area basis. Secondly, channels were recommended for major school districts in communities of 50,000 population and above, where such concentrations were not centers of attention under the area planning stage. In the third phase, attention was given to multiple service needs and major schools and universities not covered under the first two priorities. In all cases, where feasible under the existing Rules of the Federal Communications Commission, VHF channels have been requested.

GENERAL ALLOCATION CONSIDERATIONS

At the present time there are about 2,200 assignments in the Table of Assignments contained in the Rules of the Federal Communications Commission. About 720 of these channels are in use or have been applied for as commercial outlets. Another 275 have been reserved for educational television use and 60 of these have been activated to date. Forty of these are VHF outlets and 20 are in the UHF portion of the spectrum.

Fundamental to a determination of the necessary number of additional channels to meet the educational needs as defined by NAEB is the coverage which may reasonably be expected on the various types of channels. National coverage maps have been developed using average coverage radii expectancy as outlined according to the following table:

Channels	2	through	6	65 miles
"	7	"	13	55 "
"	14	"	49	40 "
"	50	"	83	30 "

These approximate average coverage radii were arrived at through consideration of many factors including:

a. Maximum powers and heights specified for various sections of the country in the Commission's Rules

b. Co-channel interference

c. Terrain effects

d. Types of ETV stations constructed to date

e. Propagation characteristics of various frequency bands available

The reported work of the Television Allocation Study Organization* in relation to the "critical distance" of television coverage at the present state of the art was also relied upon in developing these ranges. In general it was assumed that VHF educational outlets might well use the maximum effective radiated powers available under the Rules at heights up to and in some cases exceeding 1,000 feet above average terrain. The typical educational UHF station was projected as one which might utilize a 12-kilowatt transmitter, a moderately high gain antenna and a supporting tower, or other means of achieving an effective antenna height of 600 feet.

It is recognized that the radii assumed are conservative in some cases for very flat terrain and optimistic in cases of very rugged terrain. In the latter instances it has been assumed that translators will have to be used to achieve the coverages indicated and that additional channels will be available for such use. However, no effort has been made in developing this national pattern to relate these details with specificity. An example of a detailed state study, however, has been included in appendix material to illustrate this factor. State-wide studies which have been undertaken in Ohio, Maine, Kansas, Nebraska, Montana, Florida, Alabama, Wyoming, and New Mexico represent further intensive approaches to the problem for which this national set of requirements provides a point of departure.

The additional channels recommended in this study are considered for purposes of illustration on maps to be located at the center of the community for which the assignment is listed. Such a location would rarely be the case in practice, however, because line-of-sight transmission is important, particularly in the UHF range. Great reliance must be placed for the future of educational television in the UHF portion of the spectrum. This again illustrates the ultimate need for detailed engineering planning, probably on a state-by-state basis, when a national pattern is established.

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* Television Allocation Study Organization, George R. Town, "Engineering Aspects of Television Allocations", Report to the Federal Communications Commission, pp 1-731; March 1959 and Vol. II, pp 1-210; June, 1960; see also IRE Proceedings - TASO Issue, June, 1960.

TELEVISION CHANNEL REQUIREMENTS

Table 7 presents a detailed breakdown of the existing FCC Table of Assignments, together with channels recommended for addition to the reserved category as a result of this study. Table 8 is a state-by-state summary of these recommendations.

Figs. 1 through 4 show the existing and recommended reservations with their possible coverage areas. The multichannel recommendations are indicated by channel numbers given at the center of the coverage areas. Referring to Figs. 3 and 4, a limitation of the plan in dovetailing with the Table of Assignments is noted. Holes in the area-wide coverage proposals for Arizona, Nebraska, Utah, and certain other instances are due to lack of original assignments to some sparsely populated areas. In cases where such coverage should become necessary in the future as population growth continues, such needs might be handled on a drop-in basis. State studies of record have successfully incorporated this procedure in their planning.

Appendix material attached hereto illustrates certain detailed state-wide studies. It is estimated that as many as 100 more "drop-ins" might be deemed necessary in connection with state-wide specific planning, but the inclusion of such a detailed analysis has been beyond the scope of this national study.

In some cases in various states it has not been possible to meet the indicated requirements set down by NAEB, particularly as regards multiple service needs. This indicates the necessity for looking toward the development of a more efficient UHF assignment plan. Some investigations of this possibility* have already been undertaken by the Federal Communications Commission.

UHF SPECTRUM CONSIDERATIONS

The limitations in UHF receiver interference rejection capabilities and the resultant necessity of assigning UHF channels within the requirements of a rather comprehensive set of "taboo" restrictions, handicap UHF flexibility. In developing a state-wide UHF network system for Ohio, it became apparent that there was little flexibility and room for expansion in the UHF within the constraints of the present assignment plan. The Ohio plan called for 29 UHF stations, with 9 of these in either the relatively low power or translator class. While 8 channels were already included in the reserved category, it became necessary to find 21 more. A search was undertaken on a new channel "drop-in" basis for these channels. In only 9 cases, however, could the taboo requirements be met and restraints became increasingly numerous as these channels were successively developed. In 11 cases reliance finally had to be placed upon nonreserved assignments in the Commission's Table.

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*Arnold G. Skrivseth, Office of the Chief Engineer, UHF Project, Federal Communications Commission, "UHF Assignment Plan", UHF-TV Report 5.2.2., pp 1-5; May 29, 1961.

Figs. 5 and 6 show a comparison of the detailed Ohio planning with the national study result for the same state. In state educational plans undertaken to date approximately 8 VHF and 15 UHF "drop-in" channels have been engineered. The procedure in the UHF case is to take a given channel and impose the taboo limitations separately. This can be done by assuming the channel under consideration to have a specific geographical location and imposing the limitations to determine whether a "go" or "no-go" situation exists. This procedure can be adapted for computer tabulation.*

A more informative but time-consuming study involves imposing the mileage table restrictions on an area-wide basis wherein the results show an area of possible "drop-in" condition. A graphic example of the result of this technique is shown on Fig. 7. Figure 8 indicates the potential use of 3 new VHF drop-in channels in a state system. Actually the Channel 4 drop-in shown for the Kearney, Nebraska, area could also be used in Kansas if transmitter sites were properly co-ordinated.

At this point the question might be asked whether the presently assigned channels available plus "drop-ins" truly represent the maximum number of possible channel assignments. A technical research report issued by the Federal Communications Commission adeptly summarized the results of theoretical investigations into the problem of frequency assignment carried out in Europe and has applied these techniques to the continental United States.

This work indicates that, theoretically, 8,000 assignments are available in the UHF band alone as compared to a far lower number of assignments now estimated as available in the UHF and VHF bands combined. It thus appears that further practical investigations might be undertaken to increase the potential density of UHF channel assignments, particularly in light of the multiple assignment needs for educational television. This should be done now, before expansion into the UHF spectrum freezes the pattern of allocation into what appears to be a relatively inefficient spectrum utilization mold.

SUMMARY

A plan for a national television system has been developed requiring the reservation of a minimum of 633 additional channels for such use. Adoption of this proposal would bring the number of reserved channels to a total of 906 channels. A somewhat greater need is indicated by NAEB studies but it probably would not be possible to meet all these needs within the present Federal Communications Commission assignment plan framework. Some detailed studies of projected single state systems have indicated that the number of new UHF channels which might be added to the Table of Assignments is relatively limited. Exploration to find a more efficient UHF channel utilization pattern of assignments should be undertaken. A solution to this problem, possibly utilizing computer techniques, would provide improved opportunities in the future for all types of television operation. It has not yet been possible to define the spectrum needs of Airborne ETV, which undoubtedly could be better accommodated under an improved assignment pattern.

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* "A Proposal for Determining Nationwide Television Channel Assignment Plans by Computer Methods", Jansky & Bailey, submitted to National Association of Educational Broadcasters, Washington, D. C.; July, 1961.

September 1, 1961

JANSKY & BAILEY
Washington, D. C.

APPENDIX

This appendix includes several schedules and tables to be used as a reference for general information and in conjunction with the attached maps. These are reasonably self-explanatory. However, in these tables and schedules reference is made only to the use of frequencies for ground-based broadcasting stations. The prominence and size of the experimental program on Airborne Television for Instruction being conducted at Purdue University suggests that some special reference be made to this effort. There is much controversy concerning both the educational and technical aspects of the Airborne project, and for the record, two views are here reported in brief.

Dr. John E. Ivey, Jr., President of the Midwest Program on Airborne Television Instruction, and Vice President of the Purdue Research Foundation says:

> "The nation's first airborne transmission of instructional television using UHF frequencies has been in routine operation since September 1961. As documented in the supporting materials, it is now possible to conclude that airborne multiple-channel telecasting is reliable and practical in its technical, educational and economic aspects.
>
> "The issue here, in which the future of the airborne system is concerned, is simply whether it is to be national policy that television will be encouraged to play a major role in raising the quality of American education for the larger enrollments now flowing into schools and higher institutions.
>
> "If the answer is yes, the next problem is to define the magnitude of televised instructional offerings that should be made available to a school system.
>
> "A growing body of experience indicates there are few, if any, areas of learning to which television cannot make a substantial qualitative contribution.
>
> "At least 100 subject matter areas are taught in a fully developed school system of 12 grades. Teachers and pupils should not be denied the advantages of instructional television for upgrading the quality of what is taught in any of these subjects.
>
> "A one-channel television facility, however, can increase the quality of offerings in but a small fraction of this broad range of subjects, and then only in the given locality served.
>
> "On the other hand, a multi-channel system, with at least six channels, can use television to boost the quality of offerings in the preponderance of subjects taught in a 12-grade school system.
>
> "Furthermore, a six-channel system lofted to an altitude of four miles can make the advantages of television available in the preponderance of subjects taught in

> 15,000 schools at one time, to cite the potential of the region served by the Midwest Program on Airborne Television Instruction.
>
> "An airborne television service operating on six channels possess the capability of transmitting six simultaneous telecasts for six to twelve hours a day. A 12-hour basic service could provide for college and university instruction as well as at the grade and high school levels.
>
> "While this falls short of meeting the potential demand, it provides the minimum requirements in breadth of offerings and in schedule flexibility, assuming a number of offerings would need to be repeated to accommodate class schedules in some of the schools.
>
> "Actually, where single-channel television facilities exist, their instructional offerings can be in part coordinated with those of the multi-state airborne facility to serve special local needs and provide the maximum flexibility possible at this time.
>
> "When plans for the airborne system were presented to the Federal Communications Commission in October, 1959, it also proposed that a system of management for such a regional facility could be worked out in a manner that would protect and extend local control and finance of educational development. This has been done.
>
> "In short, the multi-channel airborne television system is a proven and responsible technical instrument. Its full development requires six channels. Any other regional development similar to the Midwest Program will require at least that many channels. This is one direction in which national policy regarding the use of television for instructional purposes should move.
>
> "Within the next few months, MPATI will make a formal application to the FCC for expanding its two-channel UHF experimental allocations to a six-channel UHF operation. It is hoped that other regions of the United States will follow suit. It is further hoped that present studies by the FCC will provide for such programs to be authorized and operated."

Mr. Lloyd P. Morris, President of the Board of Public Instruction in Elmwood Park, Illinois, and a long-time student of public education makes a statement which supports Dr. Ivey's contention on the effectiveness of television instruction, but disagrees with the airborne method. He writes:

> "It seems quite evident that schools could make material improvements and increases in operating efficiencies and effectiveness by using more technology on a large scale basis.
>
> "ETV seems to be one of the best new tools for education since the invention of the printing press. Some studies indicate that ETV to be most effective needs be used

on a very large scale over large areas, at least as large as a state. For this, and many other reasons, it seems pertinent that school board members look more carefully at both the air-based and land-based aspects of reasonably large ETV networks, as perhaps one of the best supplementary tools in education. Since school board members have had very little exposure to either air-based or ground based ETV, and since the cost of either approach is relatively high, it is the responsibility of board members to look carefully at both approaches. These considerations are doubly significant because school board members also have the responsibility of looking to the future and planning for those advances in education which seem to offer the greater return on the public investment in education.

"This board member has recommended many times that boards use these experimental programs to the fullest extent possible within economic reason. The contention is however that the experimental use of these programs is an entirely different matter than using public funds to finance the continuation of such a program on a country-wide basis. A further contention is that for the latter situation, country-wide application, the ground-based network may be much more practical and economical than the air-based approach advocated by MPATI!

"One of the several important aspects of large area ETV applications concerns the use and conservation of the available frequency spectrum or channels available from the Federal Communications Commission for educational TV. Board members have the responsibility to look toward the future when ETV, if it is finally proven successful, might be needed country-wide by all boards of education. This means that care should be used that some short time gains may not be off-setting to future applications country-wide.

"As one illustration of the conservation of the frequency spectrum available to education, let us consider the case wherein the limit, one airplane may fly high enough and be large enough to carry one station that would cover the continental United States. This would be the limit, as far as we could go in applying the principle of greater antenna heights; a main consideration in the MPATI program. Let us assume further that education may have, from the Federal Communications Commission (FCC), 25 frequency channels assigned only for educational purposes. Let us assume that each of these frequency channels could be repeated 20 times across the country. This is a reasonable assumption since already commercial TV stations are repeated many times across the country operating on the same frequency; ground based.

"These 25 available channels multiplied by the number of times they could be repeated across the country will result in 25 times 20 or 500 station allocations that could be made to schools and boards of education across the country. This would further mean that these 25 allocations could be operated simultaneously; being used by schools and boards of education in many different manners as best suited the educational program of the individual areas involved; using the ground-based network system arrangement now in operation by commercial entertainment TV in the United States.

"Now if we go to the airborne ETV arrangement where each channel frequency can cover the complete United States, we can see that there would be only simultaneous channels received within the country. (Because there are only 25 frequency channels available in our assumption for either method; and because of the repeatability factor of 20 has now been usurped by the airplane transmitter.)

"The actual loss for independent simultaneous ETV applications then would be 500 minimum 25 or 75 allocations. This loss of 475 possibilities for school boards across the country is a most significant limitation of allocations.

"This limiting loss is proportional to the number of times that a single frequency channel could be repeated across the country; in the above application a 20 to 1 loss in simultaneous use of ETV by schools across the country. This is an inefficient utilization of the television frequency spectrum."

Table 6

SCHEDULE BY STATES

NEED AND AVAILABILITY OF TELEVISION CHANNELS FOR EDUCATION

(September, 1961)

Legend:

I. Number of channels now reserved for education

II. Number of channels needed for education in addition to present reservations

III. Number of additional channels available under the present rules and allocations

IV. Deficit number of channels available over minimum number needed for education

V. Number of channels UNASSIGNED in present table of allocations in excess of those considered additionally available for education

VI. Number of channels proposed by Federal Communications Commission to be additionally earmarked for education under proposal in Docket 14229

	I.		II.		III.		IV.		V.	VI.
	VHF	UHF	VHF	UHF	VHF	UHF	VHF	UHF		
Alabama	3	12	1	14	0	2	1	12	21	15
Arizona	2	0	3	6	1	8	2		13	2
Arkansas	2	1	2	7	0	9	2		19	3
California	2	7	3	29	4	22		7	31	9
Colorado	3	1	2	14	1	15	1		11	4
Connecticut	0	3	1	5	0	4	1	1	2	1
Delaware	0	1	0	2	0	2			1	1
Florida	5	5	1	29	0	15	1	14	25	9
Georgia	3	3	1	15	0	15	1		20	4

	I.		II.		III.		IV.		V.	VI.
	VHF	UHF	VHF	UHF	VHF	UHF	VHF	UHF		
Hawaii	4	0	0	12					6	4
Idaho	1	1	2	7	1	8	1		7	2
Illinois	3	4	3	22	0	17	3	5	23	7
Indiana	1	8	3	7	0	10	3		21	9
Iowa	2	4	3	13	0	16	3		28	6
Kansas	2	2	3	13	2	14	1		20	4
Kentucky	0	1	1	16	0	13	1	3	16	0
Louisiana	2	2	2	14	0	16	2		20	4
Maine	3	2	2	4	0	3	2	1	16	3
Maryland-D.C.	0	2	1	12	0	8	1	4	3	2
Massachusetts	1	2	1	10	0	7	1	3	9	3
Michigan	1	12	3	24	4	16		8	28	12
Montana	5	1	3	10	3	8		2	16	6
Missouri	1	3	3	21	0	26	3		8	3
Mississippi	1	4	2	8	0	13	2		15	5
Minnesota	3	0	1	17	3	15		2	19	3
Nebraska	1	1	5	12	5	9		3	8	2
Nevada	2	0	1	6	4	3		3	11	2
New Hampshire	1	1	2	4	0	3	2	1	8	2
New Jersey	0	6	0	6	0	5		1	3	5
New Mexico	5	1	0	27	0	10		17	15	6
New York	0	12	5	32	0	19	5	13	13	4
North Dakota	3	3	0	8	6	3		5	9	7
North Carolina	1	7	2	27	0	21	2	6	18	8

	I.		II.		III.		IV.		V.	VI.
	VHF	UHF	VHF	UHF	VHF	UHF	VHF	UHF		
Ohio	0	9	3	55	0	29	3	26	5	4
Oklahoma	2	6	2	15	0	17	2		23	7
Oregon	2	1	2	16	1	15	1	1	10	3
Pennsylvania	1	4	4	24	0	26	4		7	3
Rhode Island	0	1	1	1	0	1	1		0	1
South Carolina	1	3	0	38	0	14		24	7	4
South Dakota	2	2	1	9	3	13			2	4
Tennessee	4	4	2	15	0	17	2		18	8
Texas	7	11	4	48	0	53	4		78	18
Utah	1	4	6	24	5	4	1	20	4	3
Vermont	0	1	0	7	0	7			1	1
Virginia	0	5	2	20	0	14	2	6	11	5
Wisconsin	1	12	0	36	0	12		24	19	11
Washington	3	8	5	31	0	14	5	17	14	10
West Virginia	0	4	0	24	0	9		15	5	4
Wyoming	1	0	4	9	5	8		1	9	1
TOTALS	88	187	97	825	48	608	66	245	700	244

Still left open market

656 — in addition to the 275—

NOTE: Alaska has been left out of this schedule because at this time it was not possible to establish a firm base for projection of future need, and in any event, the Alaskan allocations would not effect those in the 48 states on the continent.

June 1, 1962
Revised
Figures

735 — 79 UHF

Table 7.

TABLE OF PROPOSED TELEVISION CHANNEL ASSIGNMENTS

(September, 1961)

648 up to 745

KEY:

$\overline{15}$: EXISTING COMMERCIAL OPERATIONS AND CONSTRUCTION PERMITS

*$\underline{2}$: EXISTING EDUCATIONAL OPERATIONS AND CONSTRUCTION PERMITS

*70: EXISTING EDUCATIONAL RESERVATIONS - 275 + ㉞ = 309

26 July (FCC) Ky., Ga., Fla 9 6 12

(26): RECOMMENDED ADDITIONAL EDUCATIONAL RESERVATIONS

4- or 6+: PRESENT CARRIER OFFSET ARRANGEMENTS

picture on low side of band

picture on high side of band

engineering symbol designation

ABSENCE OF UNDERSCORE, OVERSCORE, BRACKETS, OR ASTERISK - EXISTING COMMERCIAL RESERVATIONS

If + is outside [( )+], request has been made for reservation

ALABAMA

Andalusia	*2-, *29	Florence	$\overline{15}$, *21+
Anniston	(70+)	Fort Payne	19
Auburn	56+	Gadsden	37-
Bessemer	54	Greenville	49-
Birmingham	$\overline{6}$-, *$\underline{10}$-, $\overline{13}$-, $\overline{42}$+, *48	Guntersville	40-
Brewton	23+	Huntsville	$\overline{31}$+
Clanton	77	Jasper	17
Cullman	60+	Mobile	$\overline{5}$+, $\overline{10}$+, *42, 48+
Decatur	$\overline{23}$-	Montgomery	$\overline{12}$, $\overline{20}$, *26+, $\overline{32}$
Demopolis	*18	Munford	*$\underline{7}$-, *24-
Dothan	$\overline{7}$, *19-	Opelika	*22-
Enterprise	40+	Selma	$\overline{8}$-, 58+
Eufaula	44	Sheffield	47-

Sylacauga	75
Talladega	64
Thomasville	(27-)
Troy	38-
Tuscaloosa	*14, 45, 51-
Tuskegee	16-
University	*74+

ALASKA

Anchorage	$\overline{2}$-, *7-, $\overline{11}$, $\overline{13}$-
Fairbanks	$\overline{2}$+, 4+, 7+, *9+, $\overline{11}$+, 13+
Juneau	*3, $\overline{8}$, 10
Ketchikan	2, 4, *9
Seward	4-, 9-
Sitka	13

ARIZONA

Ajo	(19-)
Bisbee	54
Casa Grande	18-
Clifton	25-
Coolidge	36+
Douglas	$\overline{3}$-, (35)
Eloy	24
Flagstaff	$\overline{9}$, $\overline{13}$
Globe	(34+)
Holbrook	14
Kingman	(6-)
Mesa	$\overline{12}$-
Miami	28+
Moronci	31
Nogales	16, 32, 44+
Phoenix	$\overline{3}$+, $\overline{5}$-, *$\underline{8}$+, $\overline{10}$-
Prescott	(15)
Safford	(21)
Tucson	$\overline{4}$-, *$\underline{6}$+, $\overline{9}$-, $\overline{13}$-
Williams	(25)
Winslow	(16-)
Yuma	$\overline{11}$-, (13+), 22+, 60

ARKANSAS

Arkadelphia	(34+)
Batesville	(30-)
Benton	40
Blytheville	64+, 74
Camden	50
Conway	62
El Dorado	$\overline{10}$-, (26-)
Fayetteville	*13-, 41-
Forrest City	22+
Fort Smith	$\overline{5}$-, *16, $\overline{22}$, 39
Harrison	(24)
Helena	54-
Hope	15-

Hot Springs	$\overline{9}$+, (52+)
Jonesboro	$\overline{8}$-, (39+)
Little Rock	*2-, $\overline{4}$, $\overline{7}$-, $\overline{11}$+, (17-), (23+)
Magnolia	28+
Malvern	46
Morrilton	43-
Newport	28
Paragould	58-
Pine Bluff	36
Russellville	(19)
Searcy	33
Springdale	35-
Stuttgart	14+

CALIFORNIA

Alturas	(13+)
Bakersfield	$\overline{10}$-, $\overline{17}$, $\overline{29}$, *39+, 51-
Bishop	(19)
Brawley	(16)
Chico	$\overline{12}$-
Corona	52
Delano	45-
El Centro	(26-), 48
Eureka	$\overline{3}$-, $\overline{6}$-, (13-)
Fresno	*18-, $\overline{24}$, $\overline{30}$+, $\overline{47}$, $\overline{53}$
Hanford	$\overline{21}$
Los Angeles	$\overline{2}$, $\overline{4}$, $\overline{5}$, $\overline{7}$, $\overline{9}$, $\overline{11}$, $\overline{13}$, (22), *28, (34)
Madera	59
Merced	(34-), 66
Modesto	14+, 58
Monterey (see Salinas)	
Napa	62
Oakland (see San Francisco)	
Oxnard	32
Palm Springs	(19+)
Petaluma	68
Pittsburg	16
Port Chicago	70
Porterville	55
Red Bluff	15
Redding	$\overline{7}$, (9)
Riverside	40, 46
Sacramento	$\overline{3}$, *$\underline{6}$, $\overline{10}$, $\overline{40}$-, (46+)
Salinas - Monterey	$\overline{8}$+, (35)
San Bernadino	18, *24-, 30
San Buenaventura	38-
San Diego	$\overline{8}$, $\overline{10}$, *15+, (27), (39), (51)
San Francisco - Oakland	$\overline{2}$+, $\overline{4}$-, $\overline{5}$+, $\overline{7}$-, *$\underline{9}$+, $\overline{20}$-, (26-), (32+), (38), (44-)
San Jose	$\overline{11}$+, 48, *54, 60

San Luis Obispo	$\overline{6}$+
Santa Barbara	$\overline{3}$-, (20), 26
Santa Cruz	56
Santa Maria	(12-), 44
Santa Paula	(16+)
Santa Rosa	(50)
Stockton	$\overline{13}$+, 36, *42, 64
Tulare	27+
Ukiah	(18)
Visalia	43, (49)
Watsonville	22-
Yreka City	(19)
Yuba City	52-

COLORADO

Alamosa	3-, (19+)
Boulder	*12, (22+)
Canon City	36
Colorado Springs	$\overline{11}$, $\overline{13}$, *17+, 23+
Craig	(19)
Delta	24-
Denver	$\overline{2}$, $\overline{4}$-, *$\underline{6}$-, $\overline{7}$, $\overline{9}$-, (20), (26+)
Durango	(6+), 15
Fort Collins	44+
Fort Morgan	(15+)
Grand Junction	$\overline{5}$-, (21+)
Greeley	(50)
La Junta	(24)
Lamar	$\overline{12}$-, (18-)
Leadville	(14+)
Longmont	32
Loveland	38
Montrose	$\overline{10}$+, (18)
Pueblo	$\overline{5}$, *8, 28+, 34-
Salida	(25)
Sterling	$\overline{3}$, (25-)
Trinidad	(21-)
Walsenburg	30-

CONNECTICUT

Bridgeport	$\overline{43}$-, (49-), *$\underline{71}$
Hartford	$\overline{3}$+, $\overline{18}$-, *$\underline{24}$
Meriden	(65-)
New Britain	$\overline{30}$+
New Haven	$\overline{8}$+, $\overline{59}$+
New London	(26+), 81
Norwalk (see Stamford)	
Norwich	57+, *$\underline{63}$-
Stamford - Norwalk	(55)
Waterbury	$\overline{53}$

DELAWARE

Dover	(48-)
Wilmington	12, *59-, (83+)

DISTRICT OF COLUMBIA

Washington	$\overline{4}$-, $\overline{5}$-, $\overline{7}$+, $\overline{9}$, $\overline{14}$-, 20+, *26-, (50-)

FLORIDA

Belle Glade	27+
Bradenton	28-
Clearwater	$\overline{32}$+, 50
Daytona Beach	$\overline{2}$-, (53)
De Land	44+
Fort Lauderdale	(17-), 39
Fort Myers	$\overline{11}$+
Fort Pierce (off air 2-11-61)	$\overline{19}$
Gainesville	*$\underline{5}$-, 20+
Jacksonville	4+, *$\underline{7}$, $\overline{12}$-, (30+), 36-
Key West	(14+), 20
Lake City	33+
Lakeland	(16+), 22+
Lake Wales	14
Leesburg	26-
Marianna	17+
Melbourne	(37-)
Miami	*$\underline{2}$, $\overline{4}$, $\overline{6}$, $\overline{7}$-, $\overline{10}$+, (23-), 33
Ocala	15+
Orlando	$\overline{6}$-, $\overline{9}$, (18), *24-, 47
Palatka	17
Panama City	$\overline{7}$+, $\overline{13}$, *30, 36+
Pensacola	$\overline{3}$-, (15-), *21, 46
Quincy	54+
St. Augustine	25+
St. Petersburg (see Tampa)	
Sanford	35+
Sarasota	34+
Tallahassee	*$\underline{11}$-, 24, 51
Tampa - St. Petersburg	*3, $\overline{8}$-, $\overline{10}$-, $\overline{13}$-, $\overline{38}$
West Palm Beach	$\overline{5}$, $\overline{12}$, *15, (21+)

GEORGIA

Albany	$\overline{10}$, (25)
Americus	31
Athens	*$\underline{8}$, 60-
Atlanta	$\overline{2}$, $\overline{5}$-, $\overline{11}$+, *$\underline{30}$, (36)
Augusta	$\overline{6}$+, $\overline{12}$+
Bainbridge	35-
Brunswick	(28+), 34-
Cairo	45+
Carrollton	33

Cartersville	63-
Cedartown	53-
Columbus	$\overline{3}$, $\overline{9}$+, *28, 34
Cordele	43
Dalton	(25+)
Douglas	(32-)
Dublin	(15)
Elberton	24+
Fitzgerald	53+
Fort Valley	(18+)
Gainesville	(52)
Griffin	39+
La Grange	(50)
Macon	$\overline{13}$+, *41+, 47+
Marietta	57+
Milledgeville	51+
Moultrie	(48-)
Newnan	61+
Rome	(59)
Savannah	$\overline{3}$+, *$\underline{9}$-, $\overline{11}$
Statesboro	(22)
Swainsboro	(20-)
Thomasville	$\overline{6}$, 27
Tifton	(14-)
Toccoa	35
Valdosta	(37+)
Vidalia	26
Waycross	$\underline{8}$+, 16

HAWAII

Hilo, Hawaii	2, *4, $\overline{9}$, 11, $\overline{13}$
Honolulu, Oahu	$\overline{2}$+, $\overline{4}$-, $\overline{9}$-, *11+, 13-
Lihue, Kauai	3+, *8-, 10+, 12-
Wailuku, Maui	$\overline{3}$, $\overline{7}$, *10, $\overline{12}$

IDAHO

Blackfoot	(33)
Boise	$\overline{2}$, *4+, $\overline{7}$
Burley	(15-)
Caldwell	(9-)
Emmett	26-
Gooding	23
Idaho Falls	$\overline{3}$, $\overline{8}$+
Jerome	(17)
Kellogg	36
Lewiston	$\overline{3}$-
Moscow	12-, *15
Nampa	$\overline{6}$, 12+
Payette	14+
Pocatello	$\overline{6}$-, $\overline{10}$
Preston	(41)
Rexburg	(27+)
Rupert	21

Sandpoint	(23-)
Twin Falls	$\overline{11}$, $\overline{13}$-
Wallace	(27-)
Weiser	(20-)

ILLINOIS

Alton	48
Aurora	75
Belleville	54+
Bloomington	(15-)
Cairo	24-
Carbondale	*$\underline{8}$, 34, 61-
Centralia	32+, 59+
Champaign - Urbana	$\overline{3}$+, *$\underline{12}$-, (21), 27, $\overline{33}$
Chicago	$\overline{2}$-, $\overline{5}$, $\overline{7}$, $\overline{9}$+, *$\underline{11}$, (20), (26), (32), 38, 44
Danville	$\overline{24}$
Decatur	$\overline{17}$, (23+)
De Kalb	*67
Dixon	47+
Elgin	83
Freeport	23
Galesburg	(77)
Harrisburg	$\overline{3}$, 22
Jacksonville	(49-)
Joliet	48+
Kankakee	(14)
Kewanee	60-
La Salle	$\overline{35}$
Lincoln	53+
Macomb	(61+)
Marion	40
Mattoon	46-
Moline (see Davenport, Iowa)	
Mt. Vernon	(38-)
Olney	(16-)
Pekin	69+
Peoria	$\overline{19}$, 25+, $\overline{31}$+, *37-, 43+
Quincy	$\overline{10}$-, 21+
Rockford	$\overline{13}$+, $\overline{39}$+, *45+
Rock Island (see Davenport, Iowa)	
Springfield	$\overline{20}$+, (26-), 36-, *66+
Streator	(65-)
Urbana (see Champaign)	
Vandalia	(28-)
Waukegan	(79+)

INDIANA

Anderson	(61), 83
Angola	77
Bedford	68
Bloomington	$\overline{4}$, *30-, 36
Columbus	42-

Connersville	38+
Elkhart (see South Bend)	
Evansville	$\overline{7}$, *9, $\overline{14}$-, $\overline{50}$-
Fort Wayne	$\overline{15}$+, $\overline{21}$+, *27+, $\overline{33}$-, (69)
Gary	(50), *66
Hammond	56-
Indianapolis	$\overline{6}$, $\overline{8}$-, $\overline{13}$-, *20-, (39), 67-
Jasper	(19+)
Kokomo	(29+)
Lafayette	$\overline{18}$, *47, 59
Lebanon	79+
Logansport	51
Madison	(66)
Marion	(31)
Michigan City	62+
Muncie	$\overline{49}$, *55+, 71
Plymouth	34-
Princeton	44+
Richmond	(26)
Shelbyville	58+
South Bend - Elkhart	$\overline{16}$, $\overline{22}$, $\overline{28}$+, *52
Tell City	78
Terre Haute	2+, $\overline{10}$, *57+, (63-), 73+
Vincennes	52+
Washington	81

IOWA

Algona	(37+)
Ames	$\overline{5}$, 25-
Atlantic	45-
Boone	19-
Burlington	(32-), 38+
Carroll	(39)
Cedar Rapids	$\overline{2}$, $\overline{9}$-, 20-, *26+
Centerville	31-
Charles City	(18-)
Cherokee	(14)
Clinton	(64)
Creston	(43)
Davenport - Rock Island - Moline, Ill.	$\overline{4}$+, $\overline{6}$+, 8, *30+, (42-), 68
Decorah	(44+)
Des Moines	$\overline{8}$-, *$\underline{11}$+, $\overline{13}$-, (17+), 23-
Dubuque	(56+), 62-
Estherville	(24+)
Fairfield	54
Fort Dodge	$\overline{21}$
Fort Madison	50+
Grinnell	71
Iowa City	*12+, 24-
Keokuk	44-
Knoxville	33-
Marshalltown	49

Mason City	$\overline{3}$+, 35-
Muscatine	58
Newton	65+
Oelwein	28
Oskaloosa	52+
Ottumwa	(15+), 63
Red Oak	(32+)
Shenandoah	20+
Sioux City	$\overline{4}$-, $\overline{9}$, *30, 36-
Spencer	42+
Storm Lake	(34+)
Waterloo	$\overline{7}$+, (16-), *22-, 46+
Webster City	(27)

KANSAS

Abilene	31+
Arkansas City	49
Atchison	60+
Chanute	50-
Coffeyville	33-
Colby	(22-)
Concordia	(47-)
Dodge City	$\overline{6}$+, (23)
El Dorado	55+
Emporia	(39-)
Fort Scott	27
Garden City	(9), $\overline{11}$+
Goodland	$\overline{10}$, (31)
Great Bend	$\overline{2}$, 28
Hayes	$\overline{7}$-, (20-)
Hutchinson	$\overline{12}$, 18
Independence	(20)
Iola	(44+)
Junction City	29+
Larned	15-
Lawrence	*11, 17-
Leavenworth	54-
Liberal	14
McPherson	(26-)
Manhattan	*$\underline{8}$, (23+)
Newton	14+
Olathe	52-
Ottawa	21-
Parsons	46-
Pittsburg	$\overline{7}$+, (38-)
Pratt	(36+)
Salina	34
Topeka	$\overline{13}$+, (42), *48+
Wellington	24-
Wichita	$\overline{3}$-, $\overline{10}$-, (16-), *22+
Winfield	43+

KENTUCKY

Ashland	$\overline{59}$-
Bowling Green	$\overline{13}$, (17+)
Campbellsville	(40+)
Corbin	(16)
Danville	35+
Elizabethtown	23
Frankfort	(43-)
Glasgow	28+
Harlan	73+
Hazard	19-
Hopkinsville	(20)
Lexington	$\overline{18}$+, $\overline{27}$-, (64), 70+
Louisville	$\overline{3}$-, $\overline{11}$+, *$\underline{15}$, 21-, $\overline{41}$-, $\overline{32}$
Madisonville	26
Mayfield	63
Maysville	(24+)
Middlesborough	(57), 63+
Murray	33-
Owensboro	(56-), 62
Paducah	$\overline{6}$+, (43), 72
Pikeville	(14-)
Princeton	45-
Richmond	60
Somerset	29-
Winchester	70+

LOUISIANA

Abbeville	27+
Alexandria	$\overline{5}$, (62+), 74
Bastrop	53+
Baton Rouge	$\overline{2}$, 9-, (18-), $\overline{28}$, *34, (40-)
Bogalusa	69, 78
Crowley	(76)
De Ridder	(70)
Eunice	64-
Franklin	46+
Hammond	57
Houma	$\overline{11}$, 30+
Jackson	59
La Fayette	$\overline{10}$, (38-), 67-
La Fayette - Lake Charles	3
Lake Charles	$\overline{7}$-, *14, $\overline{25}$, (60+)
Minden	(30)
Monroe	$\overline{8}$+, *$\underline{13}$, 43+
Morgan City	(36+)
Natchitoches	(17+)
New Iberia	(15+)
New Orleans	$\overline{4}$+, $\overline{6}$+, *$\underline{8}$, 12, (20-), (26), (32+), 61
Oakdale	54+
Opelousas	(58)

Ruston	(20)
Shreveport	$\overline{3}$-, $\underline{12}$
Thibodaux	24
Winnfield	22-

MAINE

Auburn	23+
Augusta	*$\underline{10}$-, 29+
Bangor	$\overline{2}$-, $\overline{5}$+, *16-
Bar Harbor	22-
Bath	65
Belfast	41-
Biddeford	59
Calais	7-, (20-)
Dover - Foxcroft	18+
Fort Kent	17+
Foxcroft (see Dover)	
Houlton	24
Lewiston (WMTW-TV) Poland Spring)	$\overline{8}$+, 17
Millinocket	(14+)
Orono	*12-
Portland	$\overline{6}$-, $\overline{13}$+, *47-, (53+)
Presque Isle	$\overline{8}$, *10+, 19
Rockland	25-
Rumford	55-
Van Buren	15-
Waterville	35+

MARYLAND

Annapolis	(53-)
Baltimore	$\overline{2}$+, $\overline{11}$-, $\overline{13}$+, (24+), *66, (72-)
Cambridge	(22+)
Cumberland	(17+), 30-
Fredrick	(62)
Hagerstown	(52), 68+
Salisbury	$\overline{16}$+

MASSACHUSETTS

Amherst	*82
Barnstable	25+
Boston	*$\underline{2}$+, $\overline{4}$-, $\overline{5}$-, $\overline{7}$+, (38), (44+), (56)
Brockton	62
Easthampton	61
Fall River	(46-), 68
Greenfield	$\overline{32}$+, 58-
Holyoke (see Springfield)	
Lawrence	72
Lowell	78
New Bedford	6+, (28-), 34+
North Adams	$\overline{19}$, *80+

Pittsfield	(64+)
Springfield - Holyoke	$\overline{22}$, $\overline{40}$
Worcester	$\overline{14}$, (27+)

MICHIGAN

Alma	(41+)
Alpena	$\overline{9}$+, *11, 30-
Ann Arbor	(20+), *26-
Bad Axe	(46-)
Battle Creek	(58-), 64-
Bay City	$\overline{5}$-, 19+, 63-, *73+
Benton Harbor	(40+)
Big Rapids	(39)
Cadillac	$\overline{13}$-, 45
Calumet	(5)
Cheboygan	$\overline{4}$+, 36+
Coldwater	24-
Detroit	$\overline{2}$+, $\overline{4}$, $\overline{7}$-, (50-), *$\underline{56}$, $\overline{62}$
East Lansing	60+
East Tawas	21
Escanaba	$\overline{3}$+, *49
Flint	$\overline{12}$-, 16-, *22-, 28
Gladstone	40-
Grand Rapids	$\overline{8}$+, *17+, $\overline{23}$-
Houghton	19, *25
Iron Mountain	(8-), 27
Iron River	33-
Ironwood	(12+), 31-
Jackson	(48)
Kalamazoo	$\overline{3}$-, *46, (74)
Lansing	$\overline{6}$-, 54
Ludington	33
Manistee	(15-)
Manistique	(14+)
Marquette	$\overline{6}$-, 13+, 17, *35
Midland	25-
Mount Pleasant	*14, 47-
Muskegon	(29-), 35+
Parma - Onondaga	$\overline{\underline{10}}$-
Petosky	(31)
Pontiac	(44+)
Port Huron	(34+)
Rogers City	24
Saginaw	51-, $\overline{57}$-
Sault Ste. Marie	(8), 10+, 28-, *34
Traverse City	$\overline{7}$+, 20-, *26+
West Branch	(27+)

MINNESOTA

Albert Lea	57-
Alexandria	$\overline{7}$, 36
Appleton	*10-

Austin	$\overline{6}$-, (51+)
Bemidji	(9), 24
Brainerd	(12-)
Cloquet	44
Crookston	21-
Detroit Lakes	18+
Duluth - Superior, Wisc.	$\overline{3}$, $\overline{6}$+, *8, $\overline{10}$+, (32), 38
Ely	(16)
Fairmont	40+
Fairbault	20
Fergus Falls	(16-)
Grand Rapids	(20-)
Hastings	29+
Hibbing	$\overline{13}$-
International Falls	(11)
Little Falls	14+
Mankato	$\overline{12}$, (15-)
Marshall	22+
Minneapolis - St. Paul	*2-, $\overline{4}$, $\overline{5}$-, $\overline{9}$+, $\overline{11}$-, (17), (23+)
Montevideo	19
New Ulm	43-
Northfield	(26)
Owatonna	45
Red Wing	63-
Rochester	$\overline{10}$, (55-)
St. Cloud	(33)
St. Paul (see Minneapolis)	
Stillwater	39-
Thief River Falls	15
Virginia	(26+)
Wadena	27+
Willmar	(31+)
Winona	(61)
Worthington	(32)

MISSISSIPPI

Biloxi	$\overline{13}$+, *44+, (50-)
Brookhaven	37+
Canton	16
Clarksdale	(32)
Columbia	35+
Columbus	$\overline{4}$-, (28-)
Corinth	41
Greenville	(21-), 27
Greenwood	$\overline{6}$, (24+)
Grenada	44
Gulfport	56-
Hattiesburg	(17-)
Jackson	$\overline{3}$+, $\overline{12}$+, *19+, (25-), 47
Koscuisko	(52-)

Laurel	33-
Laurel - Pachuta	$\overline{7}$
Louisville	46-
McComb	(31-)
Meridian	$\overline{11}$-, 30-, *36-
Natchez	(29+)
Pachuta (see Laurel - Pachuta)	
Pascagoula	(22)
Picayune	14-
Starkville	34-
State College	*2+
Tupelo	$\overline{9}$-, (38)
University	*20+
Vicksburg	(41+)
West Point	56+
Yazoo City	49

MISSOURI

Cape Girardeau	$\overline{12}$, (18+), 60
Carthage	(56-)
Caruthersville	(27-)
Chillicote	(14-)
Clinton	49-
Columbia	$\overline{8}$, (16+), 22-
Farmington	(52)
Festus	(25-)
Fulton	(24+)
Hannibal	$\overline{7}$-, (27+)
Jefferson City	$\overline{13}$, (33+)
Joplin	$\overline{12}$+, (30+)
Kansas City	$\overline{4}$, $\overline{5}$+, $\overline{9}$+, *$\underline{19}$+, (25+), (65)
Kennett	21
Kirksville	$\overline{3}$-, (18)
Lebanon	(23)
Marshall	(40+)
Maryville	(26)
Mexico	45
Moberly	(35+)
Monett	14
Nevada	(18-)
Poplar Bluff	15+
Rolla	(46)
St. Joseph	$\overline{2}$-, (30-), *36
St. Louis	$\overline{2}$, $\overline{4}$-, $\overline{5}$-, *$\underline{9}$, $\overline{11}$-, (30), (42+)
Sedalia	$\overline{6}$-, (28+)
Sikeston	37
Springfield	$\overline{3}$+, $\overline{10}$, *26+, (32)
West Plains	(20-)

MONTANA

Anaconda	2+
Billings	$\overline{2}$, $\overline{8}$, *11
Bozeman	*9, 22-
Butte	$\overline{4}$, $\overline{6}$+, *7-, (15+)
Cut Bank	(20+)
Deer Lodge	25+
Dillon	(20)
Glasgow	(16)
Glendive	$\overline{5}$+, (18-)
Great Falls	$\overline{3}$+, $\overline{5}$+, *23-
Hamilton	17+
Hardin	4+
Havre	(9+), 11+
Helena	(10+), $\overline{12}$
Kalispell	9-
Laurel	14+
Lewistown	(13)
Livingston	16-
Miles City	3-, *6, 10
Missoula	8-, *11-, $\overline{13}$-, (21+)
Polson	18
Red Lodge	18+
Shelby	14-
Sidney	14
Whitefish	(16+)
Wolf Point	(20-)

NEBRASKA

Alliance	(13-), 21
Beatrice	40
Broken Bow	(14-)
Columbus	49+
Fairbury	35
Falls City	(38)
Fremont	52
Grand Island	$\overline{11}$-, (21+)
Hastings	$\overline{5}$-, (27-)
Hay Springs	$\overline{4}$+
Hayes Center	$\overline{6}$
Kearney	$\overline{13}$, 19
Lexington	(23-)
Lincoln	$\overline{10}$+, *$\underline{12}$-, (18+), 24
McCook	$\overline{8}$-, (17)
Nebraska City	50
Norfolk	(33+)
North Platte	$\overline{2}$-, (9+)
Omaha	$\overline{3}$, $\overline{6}$+, $\overline{7}$, *16, (22), 28-
Scottsbluff	$\overline{10}$-, 16+
York	15

NEVADA

Boulder City	4+
Carlin	14
Carson City	37

Elko	(10-)
Ely	(3-), 6+
Fallon	(29-)
Goldfield	(5-)
Hawthorne	(31)
Henderson	$\overline{2}$-
Las Vegas	$\overline{8}$-, *10+, $\overline{13}$-
Lovelock	18+
McGill	8+
Reno	2, 4, *5, $\overline{8}$, (21+), 27-
Tonopah	9-
Winnemucca	(7+)
Yerington	33

NEW HAMPSHIRE

Berlin	(52)
Claremont	37
Concord	(76)
Durham	*$\underline{11}$
Hanover	*20+, 26
Keene	(45-)
Laconia	43
Littleton	24-
Manchester	$\overline{9}$-, 48+
Nashua	54
Portsmouth	15
Rochester	51

NEW JERSEY

Andover	*69
Asbury Park	(58)
Atlantic City	(46), 52+
Bridgeton	(64-)
Camden	*80
Freehold	*74
Hammonton	*70
Montclair	*77
Newark	$\overline{13}$-
New Brunswick	*$\underline{19}$-, 47+
Paterson	(37+)
Trenton	(41+)
Wildwood	40

NEW MEXICO

Alamogordo	(17)
Albuquerque	$\overline{4}$+, *$\underline{5}$+, $\overline{7}$+, $\overline{13}$+
Artesia	21+
Artisco - Five Points	18+
Belen	24+
Carlsbad	$\overline{6}$-, (23)
Clayton	(27-)
Clovis	12+, 35
Columbus	16-
Deming	14+

Farmington	$\overline{12}$+, 17-
Five Points (see Artisco)	
Gallup	3, *8-, 10
Hobbs	46
Hot Springs (Truth or Consequences)	(19)
Las Cruces	(22-)
Las Vegas	(14-)
Lordsburg	23+
Los Alamos	20-
Lovington	(27)
Portales	(22+)
Raton	46-, *52
Roswell	*3+, $\overline{8}$, $\overline{10}$-
Santa Fe	2+, *9+, $\overline{11}$-
Silver City	*10+, 12
Socorro	(15+)
Tucumcari	(25+)

NEW YORK

Albany - Schenectady - Troy	$\overline{6}$, $\overline{13}$, *17+, (23-), 35, 41
Amsterdam	52-
Batavia	33-
Binghamton	$\overline{12}$-, $\overline{40}$-, *$\underline{46}$+, (56+)
Buffalo	$\overline{17}$, *$\underline{23}$
Buffalo - Niagara Falls	$\overline{2}$, $\overline{4}$-, $\overline{7}$+, (29+)
Carthage	$\overline{7}$-
Clymer	37
Cortland	72
Dunkirk	(46)
Elmira	$\overline{18}$+, (24-), 30
Glen Falls	39+
Gloversville	(29-)
Hornell	(50)
Ithaca	*$\underline{14}$+, 20-
Jamestown	(58+)
Kingston	66-
Lake Placid	$\overline{5}$
Malone	(47), *66
Massena	(14-)
Middletown	(60)
New York	$\overline{2}$, $\overline{4}$, $\overline{5}$+, $\overline{7}$, $\overline{9}$+, $\overline{11}$+, *$\underline{25}$, $\overline{31}$-
Niagara Falls (see Buffalo - Niagara Falls)	
Ogdensburg	(24+)
Olean	54+
Oneonta	(62-)
Oswego	31
Patchogue	(75)
Plattsburg	28+
Poughkeepsie	(21-), *83
Rochester	$\overline{5}$-, $\overline{10}$+, (15-), *$\underline{21}$, 27+
Rome (see Utica)	

Saranac Lake	(18)
Schenectady (see Albany)	
Syracuse	$\overline{3}$-, $\overline{8}$, *$\underline{43}$+
Troy (see Albany)	
Utica - Rome	$\overline{2}$-, *25+, (54-)
Vail Mills	$\overline{10}$-
Watertown	(48)

NORTH CAROLINA

Ahoskie	53
Albemarle	20
Asheville	$\overline{13}$-, *56-, $\overline{62}$+, (78)
Burlington	63
Burnsville	18
Chapel Hill	*$\underline{4}$+
Charlotte	$\overline{3}$, 9+, (36+), *42+
Durham	$\overline{11}$+, *40-, (46+), 73-
Elizabeth City	(31+)
Fayetteville	(18-), 54-
Gastonia	(48)
Goldsboro	(34), 72
Greensboro	$\overline{2}$-, *51-, (57-)
Greensboro - High Point - Winston-Salem	8-
Greenville	$\overline{9}$-
Henderson	52-
Hendersonville	27
Hickory	(30-)
High Point (also see Greensboro - High Point - Winston-Salem)	15+
Jacksonville	(16)
Kannapolis	59+
Kinston	(45)
Laurinburg	41-
Lumberton	(21+)
Mount Airy	(55)
New Bern	$\overline{12}$+
Raleigh	$\overline{5}$, *22-, (28-)
Roanoke Rapids	(30+)
Rocky Mount	50+
Salisbury	(80)
Sanford	38
Shelby	(39)
Southern Pines	49
Statesville	(64-)
Washington	$\overline{7}$
Wilmington	3-, $\overline{6}$, (29-), *35+
Wilson	(56)
Winston-Salem (see also Greensboro - High Point - Winston-Salem)	$\overline{12}$, (26+), *32-

NORTH DAKOTA

Bismarck	$\overline{5}$, $\overline{12}$-, 18, *24
Bottineau	(16+)
Carrington	26-
Devils Lake	(8+), 14-
Dickinson	$\overline{2}$+, (4), *17
Fargo	$\overline{6}$, $\overline{11}$+, *13, 34-, 40
Grafton	17
Grand Forks	*2, $\overline{10}$
Harvey	22+
Jamestown	(7-), 42
Lisbon	(23)
Minot	*6+, $\overline{10}$-, $\overline{13}$-
New Rockford	20+
Pembina	$\overline{12}$
Rugby	38-
Valley City	$\overline{4}$-, 32-
Wahpeton	(45+)
Williston	$\overline{8}$-, (11-), *34+

OHIO

Akron	$\overline{49}$+, *55-, (61+)
Ashtabula	$\overline{15}$
Athens	(62-)
Bellefontaine	63
Bowling Green	*70
Cambridge	(26)
Canton	(29)
Chillicothe	(56+)
Cincinnati	$\overline{5}$-, $\overline{9}$, $\overline{12}$, *$\underline{48}$-, (54-), $\overline{74}$-
Cleveland	$\overline{3}$, $\overline{5}$+, $\overline{8}$, (19), *25+, (65+)
Columbus	$\overline{4}$-, $\overline{6}$+, $\overline{10}$+, *$\underline{34}$, (40-)
Coshocton	20
Dayton	$\overline{2}$, $\overline{7}$+, *16+, $\overline{22}$+
Defiance	(43)
Findlay	(53)
Fremont	59+
Gallipolis	72
Hamilton - Middletown	65
Lancaster	(68-)
Lima	$\overline{35}$-, (73)
Lorain	31-
Mansfield	(36+)
Marion	(17-)
Massillon	23+
Mount Vernon	58
Newark	*28-, 60-
Oxford	*$\underline{14}$+
Piqua	44-
Portsmouth	(30)
Sandusky	42+
Springfield	(52-), 76

Steubenville (see Wheeling, W. Va.)

Tiffin	(47+)
Toledo	$\overline{11}$-, $\overline{13}$, *$\underline{30}$+, (79)
Warren	(67+)
Youngstown	$\overline{21}$-, $\overline{27}$, $\overline{33}$, (73-)
Youngstown, Ohio - New Castle, Pa.	$\overline{45}$-
Zanesville	$\overline{18}$-, 50+

OKLAHOMA

Ada	$\overline{10}$+, (50+)
Altus	(36)
Alva	(30)
Anadarko	58-
Ardmore	$\overline{12}$-, (55-)
Bartlesville	62-
Blackwell	51-
Chickasha	64
Claremore	15
Clinton	32-
Duncan	39-
Durant	(27-)
Elk City	$\overline{8}$+, (15+), 26+
El Reno	56+
Enid	$\overline{5}$, 21, *27+
Fredrick	44
Guthrie	48
Guymon	(20+)
Hobart	23+
Holdenville	14-
Hugo	(21+)
Lawton	$\overline{7}$+, *28+, 34-
McAlester	(47)
Miami	(58+)
Muskogee	*45+, 66+
Norman	31-, *37-
Oklahoma City	$\overline{4}$-, $\overline{9}$-, *$\underline{13}$, (19+), ($\underline{25}$-)
Okmulgee	26
Pauls Valley	61
Ponca City	(40-)
Pryor Creek	54
Sapulpa	42-
Seminole	59
Shawnee	(53-)
Stillwater	29-, *69
Tulsa	$\overline{2}$+, $\overline{6}$, $\overline{8}$-, *$\underline{11}$-, (17+), (23)
Vinita	28-
Woodward	(35+)

OREGON

Albany	55+
Ashland	(14-)
Astoria	(30-)

Baker	37+
Bend	(15-)
Brookings	(8+)
Burns	(16)
Coos Bay	$\overline{11}$
Corvallis	*$\underline{7}$-, 49-
Eugene	$\overline{9}$+, $\overline{13}$, (20+), 26
Grants Pass	30
Klamath Falls	$\overline{2}$-, (17)
LaGrande	(13+)
Lebanon	(43+)
McMinnville	(46-)
Medford	$\overline{5}$, 10+
North Bend	(16+)
Pendelton	28
Portland	$\overline{2}$, $\overline{6}$+, $\overline{8}$-, *$\underline{10}$, $\overline{12}$, (21-), (27+)
Roseburg	$\overline{4}$+, (28+)
Salem	3+, *18-, (24+), 66
Springfield	37-
The Dalles	(32)

PENNSYLVANIA

Allentown	(39), (67)
Altoona	$\overline{10}$-, (25-)
Bethlehem	51-
Bradford	(80-)
Butler	(43-)
Chambersburg	(46-)
Du Bois	(31+)
Easton	57-
Emporium	(42-)
Erie	$\overline{12}$, $\overline{35}$+, *41-, (66+)
Harrisburg	$\overline{21}$+, $\overline{27}$-, (33+)
Hazelton	63
Johnstown	$\overline{6}$, (19+), $\overline{56}$-
Lancaster	$\overline{8}$-, (55+)
Lebanon	$\overline{15}$+
Lewiston	75-
Lock Haven	$\overline{32}$-
Meadville	(62+)
New Castle (see Youngstown, Ohio)	
Oil City	(64)
Philadelphia	$\overline{3}$, $\overline{6}$-, $\overline{10}$, $\overline{17}$-, (23+), (29), *$\underline{35}$-
Pittsburgh	$\overline{2}$-, $\overline{4}$+, $\overline{11}$, *$\underline{13}$-, *$\underline{16}$, (22), 53+
Reading	(61-)
Scranton	$\overline{16}$-, $\overline{22}$-, 44
Shamokin	65
Sharon	(39+)
Shinglehouse	60+
State College	*69+
Sunbury	(38)

Uniontown	(14)
Washington	(63+)
Wilkes-Barre	$\overline{28}$, (34)
Williamsport	(26+)
York	$\overline{43}$, (49)

RHODE ISLAND

Providence	$\overline{10}$+, $\overline{12}$+, (16), *36+

SOUTH CAROLINA

Aiken	(54)
Anderson	$\overline{40}$, (58-)
Camden	14
Charleston	$\overline{2}$+, $\overline{4}$, $\overline{5}$+, *7-, (17+)
Clemson	*68
Columbia	$\overline{10}$-, $\overline{19}$+, $\overline{25}$-, *31-
Conway	(23-)
Florence	(31+), 60
Georgetown	27-
Greenville	$\overline{4}$-, (23+), *29
Greenwood	(21-)
Lake City	55+
Lancaster	67+
Laurens	(45-)
Marion	43-
Newberry	(70)
Orangeburg	(44-)
Rock Hill	(61-)
Spartansburg	$\overline{7}$+, (17-), (74-)
Sumter	(47)
Union	65-

SOUTH DAKOTA

Aberdeen	$\overline{9}$-, (17+)
Belle Fourche	(23+)
Brookings	*8, 25
Hot Springs	(17+)
Huron	(12+), 15+
Lead	$\overline{5}$-, 26
Madison	(46)
Mitchell	$\overline{5}$+, (20-)
Mobridge	(27-)
Pierre	(10+), *22+
Rapid City	$\overline{3}$+, $\overline{7}$+, (15-)
Reliance	$\overline{6}$-
Sioux Falls	$\overline{11}$, $\overline{13}$+, (38+), *44-
Sturgis	(20)
Vermillion	*$\underline{2}$+, 41
Watertown	$\overline{3}$-, (35+)
Winner	(18-)
Yankton	(17-)

TENNESSEE

Athens	(14+)
Bristol, Tenn. - Bristol, Va.	$\overline{5}$+, (46-)
Chattanooga	$\overline{3}$+, $\overline{9}$, $\overline{12}$-, (43+), 49+, *55-
Clarksville	(53)
Cleveland	38+
Columbia	39-
Cookeville	(24), *69
Crossville	*77
Covington	19-
Dyersburg	46+
Elizabethton	(22+)
Fayetteville	(27+)
Gallatin	48+
Harriman	67
Humboldt	(25)
Jackson	$\overline{7}$+, (16+)
Johnson City	$\overline{11}$-, (34+)
Kingsport	28
Knoxville	$\overline{6}$, $\overline{10}$+, *20+, $\overline{26}$-
Lawrenceburg	50+
Lebanon	58
Lexington	*11
McMinnville	46
Maryville	(51)
Memphis	$\overline{3}$-, $\overline{5}$+, *$\underline{10}$+, $\overline{13}$+, (42-), (48-)
Morristown	54+
Murfreesboro	(18-)
Nashville	*2-, $\overline{4}$+, $\overline{5}$, $\overline{8}$+, (30+), (36+)
Oak Ridge	(79)
Paris	51+
Pulaski	44-
Shelbyville	56
Sneedville	*2+
Springfield	42
Tullahoma	68-
Union City	55

TEXAS

Abilene	$\overline{9+}$, (33)
Alice	(34+)
Alpine	$\overline{12}$-
Amarillo	*2-, $\overline{4}$, $\overline{7}$, $\overline{10}$
Athens	(25+)
Austin	$\overline{7}$+, (18-), (24), *70-
Ballinger	25
Bay City	(33)
Beaumont - Port Arthur	$\overline{4}$-, $\overline{6}$-, $\overline{12}$-, 31+, *37
Beeville	(38-)

Big Spring	$\overline{4}$-, (34+)
Bonham	43
Borger	33
Brady	(15-)
Breckenridge	(14+)
Brenham	52-
Brownfield	15
Brownsville	(26), 44
Brownsville - Harlingen - Weslaco	$\overline{4}$+, $\overline{5}$-
Brownwood	19
Bryan	(54-)
Bryan - College Station (also see College Station)	$\overline{3}$+
Childress	(40)
Cleburne	57
Coleman	21-
College Station (also see Bryan - College Station)	*48-
Conroe	20+
Corpus Christi	3-, $\overline{6}$+, $\overline{10}$-, *16+, (22), (43)
Corsicana	47+
Crockett	56
Crystal City	(44+)
Cuero	25-
Dalhart	16
Dallas	$\overline{4}$+, $\overline{8}$, *$\underline{13}$+, 23, (29), (73)
Del Rio	(16-), 52+
Denison	52
Denton	*2, 17
Eagle Pass	22-, 64
Edinburg	(60)
El Campo	27
El Paso	$\overline{4}$, *7, $\overline{9}$, $\overline{13}$, (26+), 38, 50, 62
Falfurrias	52
Floydada	45
Fort Stockton	(22)
Fort Worth	$\overline{5}$+, $\overline{11}$-, 20-, *26-
Gainesville	49-
Galveston	(35-), 41-, *47-
Gonzales	(64+)
Greenville	69-
Harlingen (also see Brownsville - Harlingen - Weslaco)	(23)
Hebbronville	58
Henderson	42+
Hereford	(19-)
Hillsboro	63
Houston	$\overline{2-}$, *$\underline{8}$-, $\overline{11}$+, $\overline{13}$-, (23+), 29-, (39-)

Huntsville	(15)
Jacksonville	36-
Jasper	(49+)
Kermit	14
Kilgore	59-
Kingsville	40
Lamesa	28
Lampasas	(40-)
Laredo	$\overline{8}$, 13, *15+, (27-), 39
Levelland	38-
Littlefield	32
Longview	32, 38+
Lubbock	*$\underline{5}$-, $\overline{11}$, $\overline{13}$-, (20), (26)
Lufkin	$\overline{9}$, 46-
McAllen	20-
McKinney	65-
Marfa	(19+)
Marshall	(16-)
Mercedes	66
Mexia	50-
Midland	$\overline{2}$+, (18)
Mineral Wells	38
Mission	70+
Monahans	$\overline{9}$-
Mount Pleasant	35
Nacogdoches	$\overline{19}$-, (40+)
New Braunfels	62-
Odessa	$\overline{7}$-, (24-)
Orange	43-
Pampa	(17-)
Paris	33+
Pearsall	31
Pecos	(16+)
Perryton	(22)
Plainview	29+
Port Arthur (see Beaumont)	
Presidio	21
Quanah	42
Raymondville	64-
Rosenberg	17-
San Angelo	3-, $\overline{8}$+, 17+, *23-
San Antonio	$\overline{4}$, $\overline{5}$, *9-, $\overline{12}$+, (35+), $\overline{41}$+
San Benito	48
San Marcos	53+
Sequin	14-
Seymour	24+
Sherman	(46+)
Snyder	(30+)
Stephenville	(32+)
Sulphur Springs	(41)
Sweetwater	$\overline{12}$
Taylor	58+
Temple	$\overline{6}$, 16, 22+
Terrell	53

Texarkana	$\overline{6}$+, *18, (24-)
Tyler	$\overline{7}$, 61+, 72
Uvalde	(20)
Vernon	18+
Victoria	(19+)
Waco	$\overline{10}$+, *28-, (34)
Waxahachie	45-
Weatherford	51
Weslaco (see Brownsville-Harlingen-Weslaco)	
Wichita Falls	$\overline{3}$, $\overline{6}$-, *16+, (22-)
Zapata	(49)

UTAH

Brigham	36-
Cedar City	(5)
Logan	$\overline{12}$-, 30, *46
Ogden	$\overline{9}$+, *$\underline{18}$-, 24
Price	(6)
Provo	(11+), (22), *28
Richfield	(13+)
St. George	(18+)
Salt Lake City	$\overline{2}$-, $\overline{4}$-, $\overline{5}$+, *$\underline{7}$-, (20+), (26)
Tooele	44
Vernal	(3+)

VERMONT

Bennington	(69-)
Brattleboro	(77+)
Burlington	$\overline{3}$, *16+, (22+)
Montpelier	(57)
Newport	(46)
Rutland	(49+)
St. Albans	34-
St. Johnsbury	(30)

VIRGINIA

Blacksburg	*60+
Bristol (see Bristol, Tenn.)	
Charlottesville	*45+, 64+
Covington	44+
Danville	(24-)
Emporia	25+
Farmville	(19)
Fredricksburg	(47)
Front Royal	(39-)
Harrisonburg	$\overline{3}$-, (34-)
Lexington	(54)
Lynchburg	$\overline{13}$, (16-)
Marion	(50)
Martinsville	35-
Newport News (see Norfolk - Portsmouth - Newport News)	

Norfolk - Portsmouth	27
Norfolk - Portsmouth - Newport News	$\overline{3}$+, $\overline{10}$+, $\overline{13}$-, (15), *21-, (33)
Norton	(52+)
Petersburg	$\overline{8}$, 41
Portsmouth (see Norfolk - Portsmouth, also see Norfolk - Portsmouth - Newport News)	
Pulaski	37-
Richmond	$\overline{6}$+, $\overline{12}$-, *23, (29+)
Roanoke	$\overline{7}$-, $\overline{10}$, (27+), *33-
South Boston	14+
Staunton	(36)
Waynesboro	42
Williamsburg	17
Winchester	28+

WASHINGTON

Aberdeen	(58)
Anacortes	(34)
Bellingham	$\overline{12}$+, (18+), 24-
Bremerton	44, 50
Centralia	(17)
Clarkston	34+, 40+
Ellensburg	49, *65
Ephrata	$\overline{16}$-, 43
Everett	(22-), (28-)
Grand Coulee	(37)
Hoquiam	(52)
Kelso	(39)
Kennewick	31
Kennewick - Richland - Pasco	*41
Longview	33
Moses Lake	(33-)
Okanogan (see Omak)	
Olympia	(60)
Omak - Okanogan	*35-
Pasco (also see Kennewick - Richland - Pasco)	$\overline{19}$-
Port Angeles	(16+)
Pullman	*10-, 24
Richland (also see Kennewick - Richland - Pasco)	25
Seattle	$\overline{4}$, $\overline{5}$+, $\overline{7}$, *$\underline{9}$, (20), (26+)
Spokane	$\overline{2}$-, $\overline{4}$-, $\overline{6}$-, *7+
Tacoma	$\overline{11}$+, $\overline{13}$-, *$\underline{56}$, $\overline{62}$
Walla Walla	$\overline{22}$, 44-, *50
Wenatchee	27, *45, 55
Yakima	$\overline{23}$+, $\overline{29}$+, *47

WEST VIRGINIA

Beckley	$\overline{4}$, (21), 66
Bluefield	$\overline{6}$-, (41+)
Charleston	$\overline{8}$+, *43+, (49-)
Clarksburg	$\overline{12}$+, (69-)
Elkins	40+
Fairmont	(35)
Hinton	31
Huntington	$\overline{3}$+, $\overline{13}$+, *53-
Logan	(23-)
Martinsburg	(58-)
Morgantown	*24
Parkersburg	$\overline{15}$-
Welch	(25)
Weston	$\overline{5}$, (32)
Wheeling	*57+
Wheeling - Steubenville, Ohio	$\overline{7}$, $\overline{9}$+, 51+
Williamson	17

WISCONSIN

Adams	*58+
Appleton	(42+)
Ashland	15+
Beaver Dam	(52-)
Beloit	57
Chilton	*31+
Eau Claire	$\overline{13}$, *19+, 25+
Fond du Lac	54+
Green Bay	$\overline{2}$+, $\overline{5}$+, $\overline{11}$+, (70+)
Janesville	(63+)
Kenosha	(61-)
La Crosse	$\overline{8}$+, *32+, 38-, 72
Madison	$\overline{3}$, *$\underline{21}$-, 27-, $\overline{33}$+
Manitowoc	(65)
Marinette	32-, *38+
Milwaukee	$\overline{4}$-, $\overline{6}$, *$\underline{10}$+, $\overline{12}$, $\overline{18}$+, (24+), (30), *36
Oshkosh	(48-)
Park Falls	*18
Portage	17-
Prairie du Chien	(34)
Racine	49-, 55
Rhinelander	22
Rice Lake	21+
Richland Center	15, *66-
Sheboygan	(59-)
Shell Lake	*30-
Sparta	50-
Stevens Point	20+, 26-
Sturgeon Bay	44-
Superior (see Duluth, Minn.)	
Wausau	$\overline{7}$-, 9, 16+, *46-
Wisconsin Rapids	(14-)

WYOMING

Buffalo	29
Casper	$\overline{2}$+, (6+)
Cheyenne	$\overline{5}$+
Cody	(24-)
Douglas	14
Evanston	14-
Gillette	(31-)
Green River	16
Greybull	40
Lander	(7), 17-
Laramie	*8+, 18+
Lovell	36+
Lusk	(19-)
Newcastle	(28+)
Powell	(30+)
Rawlins	(11-)
Riverton	$\overline{10}$+
Rock Springs	(13)
Sheridan	$\overline{9}$-, (12+)
Thermopolis	(15)
Torrington	(27)
Wheatland	24+
Worland	(34)

TABLE 8

SUMMARY OF TABLE 7

(September, 1961)

		Noneducational Channels		Educational Channels	
State	Total Present Assignments	Existing Stations and Construction Permits	Non-reserved	Existing Stations and Construction Permits	Recommended Minimum Additional Reservations
Alabama	50	13	23	14	2
Alaska	19	6	9	4	0
Arizona	35	11	22	2	9
Arkansas	39	8	28	3	9
California	100	34	57	9	26
Colorado	42	11	27	4	16
Connecticut	16	7	6	3	4
Delaware	4	0	3	1	2
District of Columbia	8	5	2	1	1
Florida	65	21	35	9	10
Georgia	54	13	36	5	15
Hawaii	18	8	6	4	0
Idaho	28	10	16	2	9
Illinois	64	17	40	7	17
Indiana	56	16	31	9	10
Iowa	62	12	44	6	16
Kansas	50	10	36	4	15
Kentucky	38	8	29	1	12
Louisiana	52	11	36	5	16

		Noneducational Channels		Educational Channels	
State	Total Present Assignments	Existing Stations and Construction Permits	Non-reserved	Existing Stations and Construction Permits	Recommended Minimum Additional Reservations
Maine	30	6	19	5	3
Maryland	14	4	9	1	7
Massachusetts	27	8	16	3	7
Michigan	79	18	48	14	20
Minnesota	52	12	37	3	18
Mississippi	41	8	28	5	13
Missouri	55	17	34	4	26
Montana	42	9	27	6	11
Nebraska	36	12	22	2	11
Nevada	24	4	18	2	7
New Hampshire	14	1	11	2	3
New Jersey	15	1	8	6	5
New Mexico	40	9	25	6	10
New York	67	24	33	10	19
North Carolina	58	11	39	8	21
North Dakota	35	11	18	6	7
Ohio	66	23	34	9	20
Oklahoma	58	9	40	8	17
Oregon	39	10	26	3	16
Pennsylvania	59	21	33	5	26
Rhode Island	4	2	1	1	1

		Noneducational Channels		Educational Channels	
State	Total Present Assignments	Existing Stations and Construction Permits	Non-reserved	Existing Stations and Construction Permits	Recommended Minimum Additional Reservations
South Carolina	34	9	21	4	14
South Dakota	31	9	18	4	14
Tennessee	58	15	35	8	17
Texas	195	46	131	18	53
Utah	22	5	13	4	9
Vermont	10	1	8	1	7
Virginia	40	10	25	5	14
Washington	53	15	28	10	14
West Virginia	28	10	14	4	9
Wisconsin	56	13	31	12	12
Wyoming	27	4	22	1	13
Totals	2209	578	1358	273	633

INDEX OF MAPS

Figure 1	An ETV Plan Utilizing the Existing Table of Assignments and Showing Probable Coverage for the North-East sector of the United States. The BLACK plate shows the existing reservations; the BLUE plate shows the additional reservations needed to provide complete area coverage; the RED plate shows additional channels available in the present Table to provide for the multi-channels needs reported in the survey. The 3-color plate shows how all the possible ETV channels from the present Table of Allocations fit together with reference to the areas of need.
Figure 2	An ETV Plan Utilizing the Existing Table of Assignments and Showing Probable Coverage for the South-East Sector of the United States. The BLACK plate shows the existing reservations; the BLUE plate shows the additional reservations needed to provide complete area coverage; the RED plate shows additional channels available in the present Table to provide for the multi-channel needs reported in the survey. The 3-color plate shows how all the possible ETV channels from the present Table of Allocations fit together with reference to the areas of need.
Figure 3	An ETV Plan Utilizing the Existing Table of Assignments and Showing Probable Coverage for the North-West Sector of the United States. The BLACK plate shows the existing reservations; the BLUE plate shows the additional reservations needed to provide complete area coverage; the RED plate shows additional channels available in the present Table to provide for the multi-channel needs reported in the survey. The 3-color plate shows how all the possible ETV channels from the present Table of Allocations fit together with reference to the areas of need.
Figure 4	An ETV Plan Utilizing the Existing Table of Assignments and Showing Probable Coverage of the South-West Sector of the United States. The BLACK plate shows the existing reservations; the BLUE plate shows the additional reservations needed to provide complete area coverage; the RED plate shows additional channels available in the present Table to provide for the multi-channel needs reported in the survey. The 3-color plate shows how all the possible ETV channels from the present Table of Allocations fit together with reference to the areas of need.
Figure 5	Single Coverage Plan of September, 1960 for the Ohio Interim Educational Television Study Commission

Figure 6	Present National Study Proposed Coverage for the State of Ohio. The BLACK plate shows the existing reservations; the BLUE plate shows the additional reservations needed to provide complete area coverage; the RED plate shows additional channels available in the present Table to provide for the multi-channel needs reported in the survey. The 3-color plate shows how all the possible ETV channels from the present Table of Allocations fit together with reference to the areas of need.
Figure 7	UHF Channel Drop-In Study of September, 1960 for Marietta, Ohio Showing the Several Interference Restrictions
Figure 8	Results of an Engineering Study for the State of Nebraska Showing How Unallocated Channels Were Dropped In.
Figure 9	ETV Stations in the United States, September 1, 1961
Figure 10	Proposed Montana State ETV Network
Figure 11	Station's Primary Network for Kentucky
Figure 12	Channel Allocation and Predicted Coverage, Kansas State Educational Television Network Survey.
Figure 13	Location of Production and Transmitting Centers and Interconnecting Microwave Network, Kansas State Educational Television Network Survey.
Figure 14	Proposed Network of ETV Stations, Approved by the Georgia State Board of Education.

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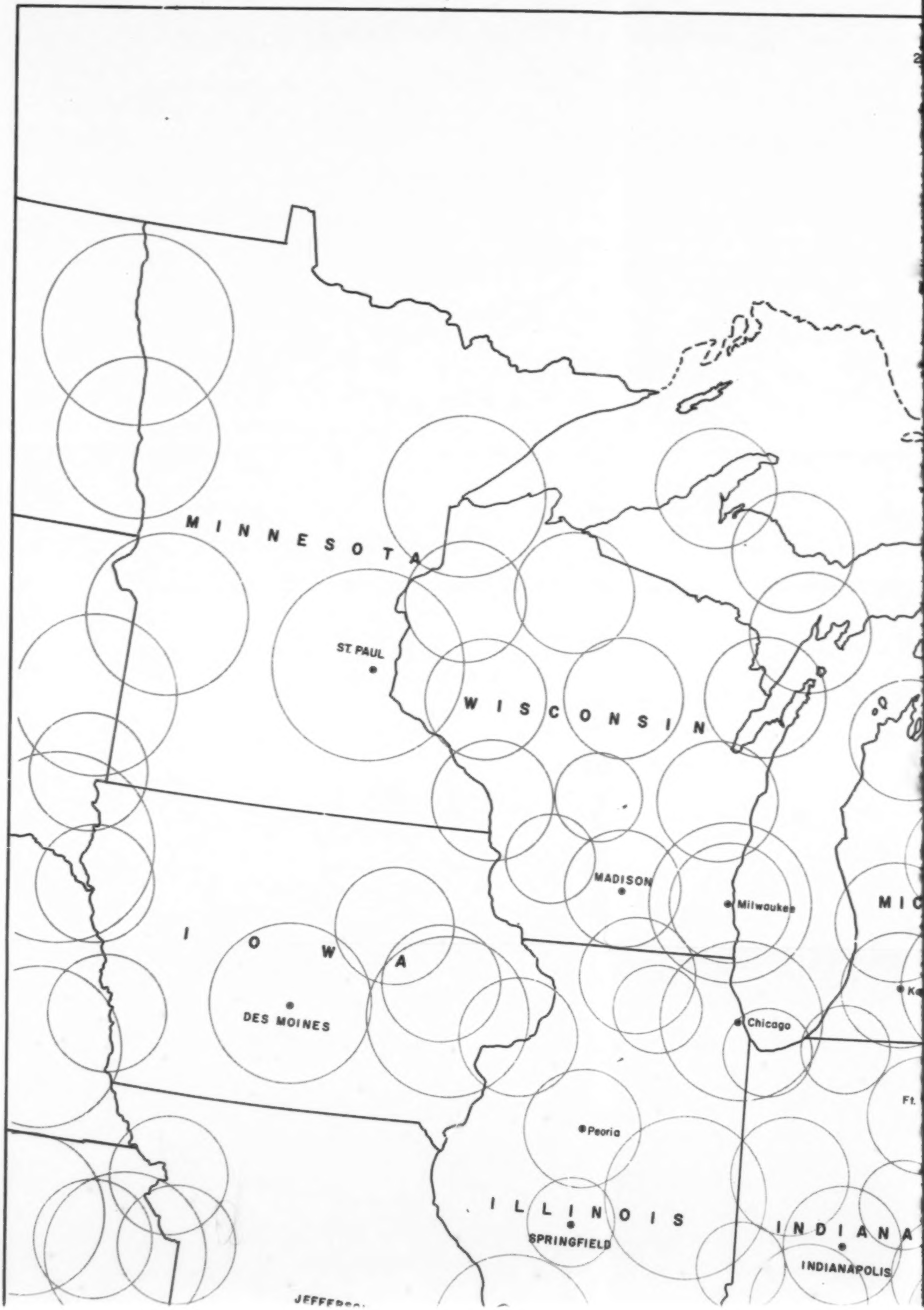
MAPS

(See cover envelope for figures 1, 2, 3, 4, and 6)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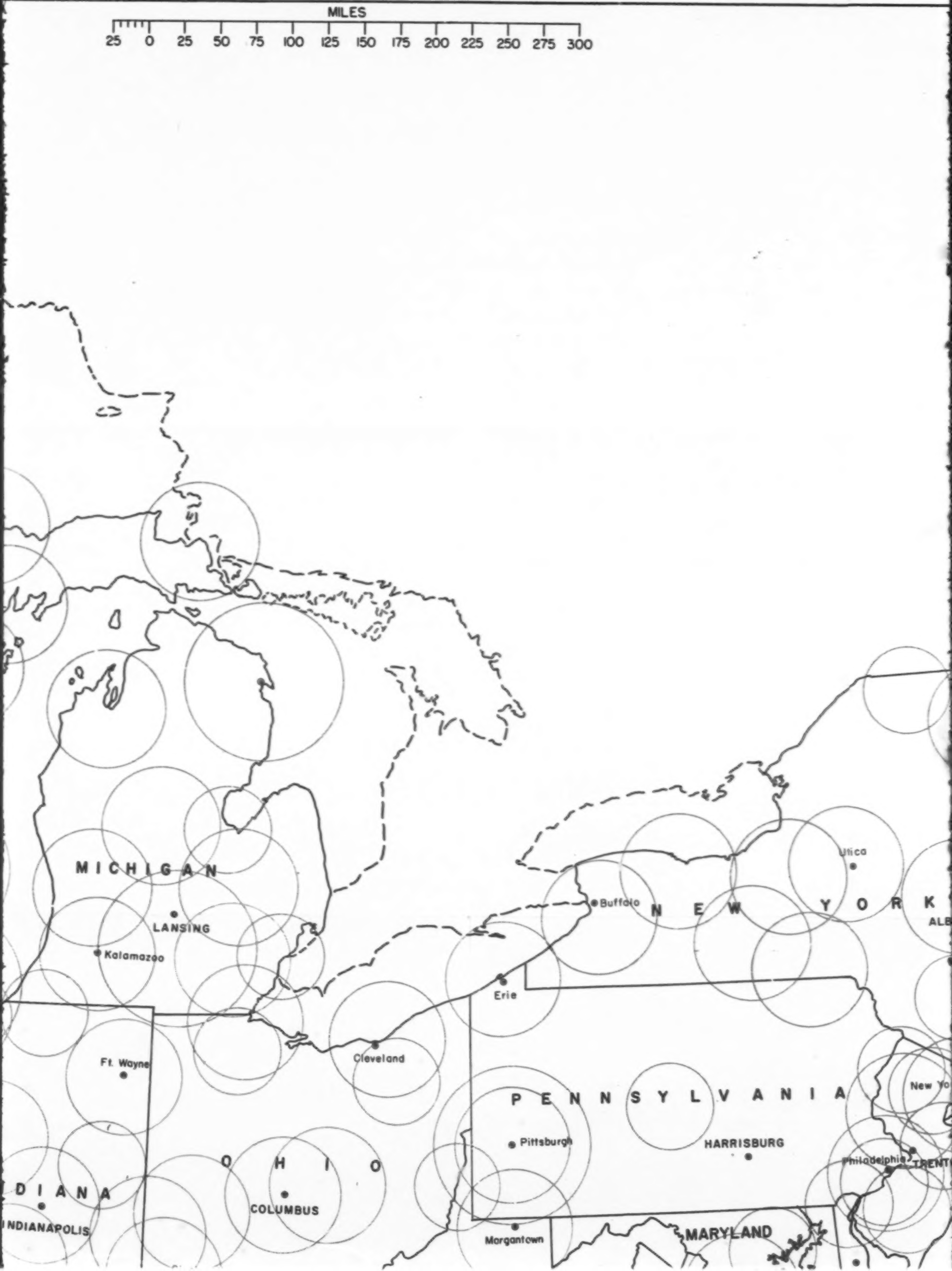
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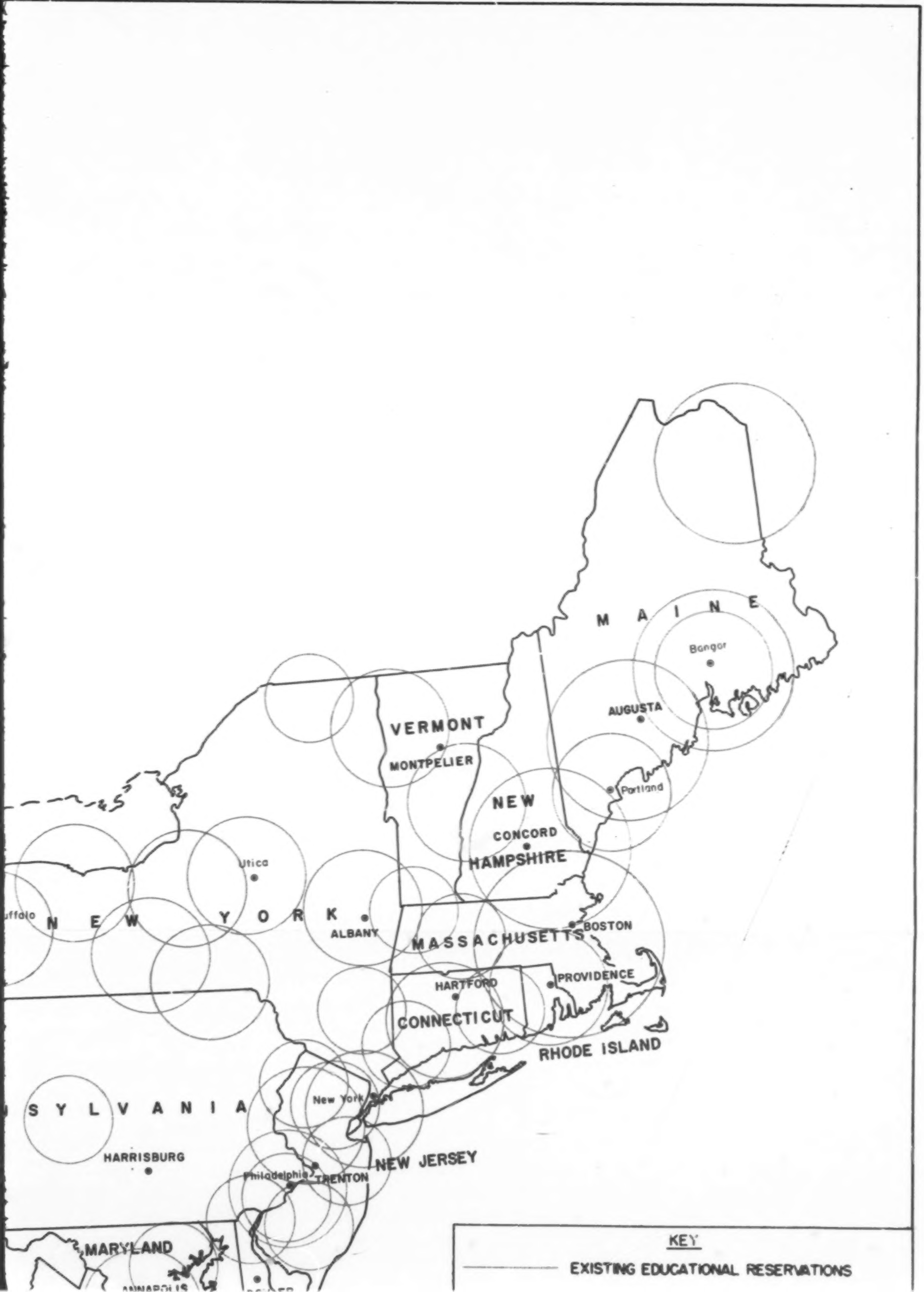
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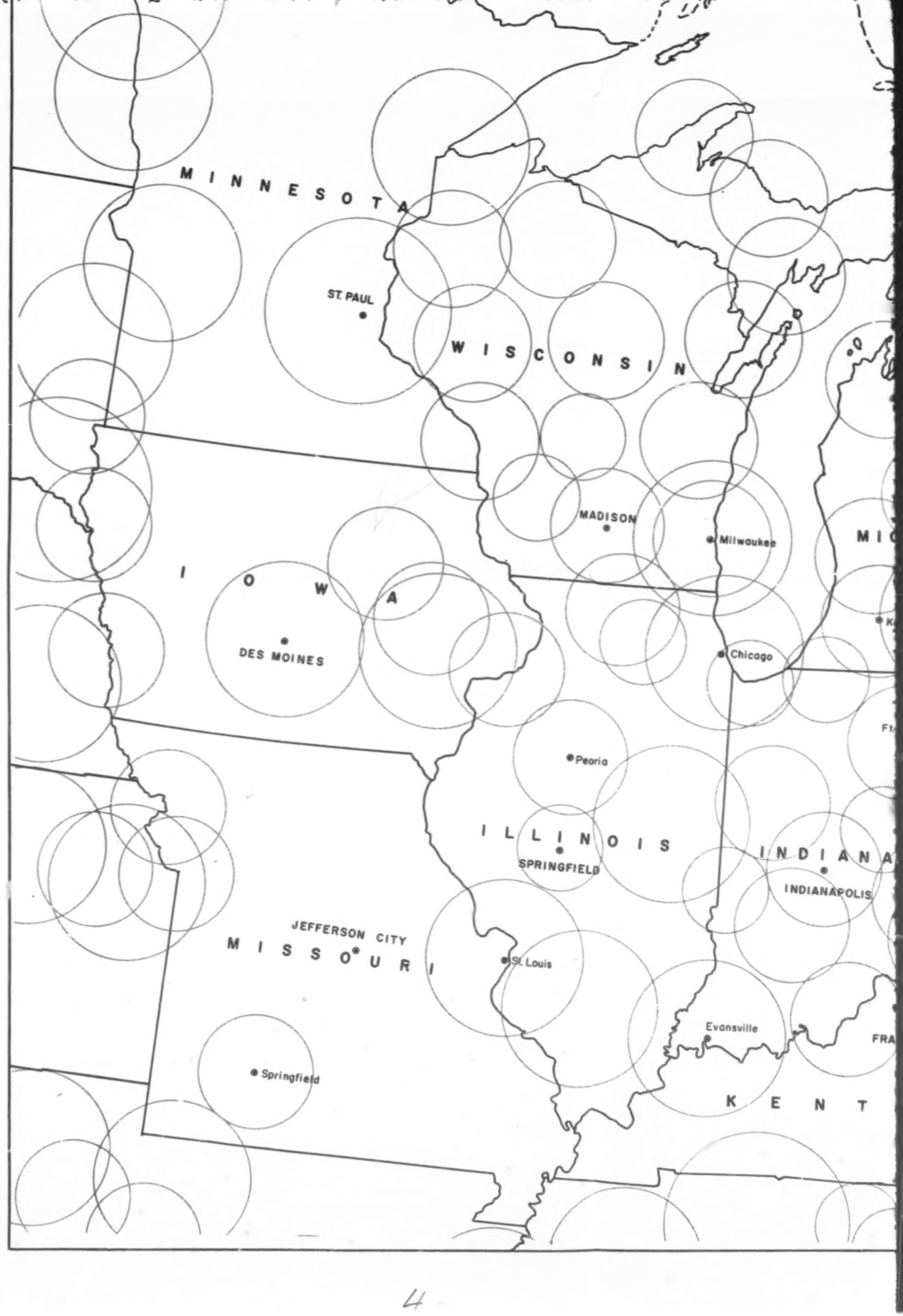
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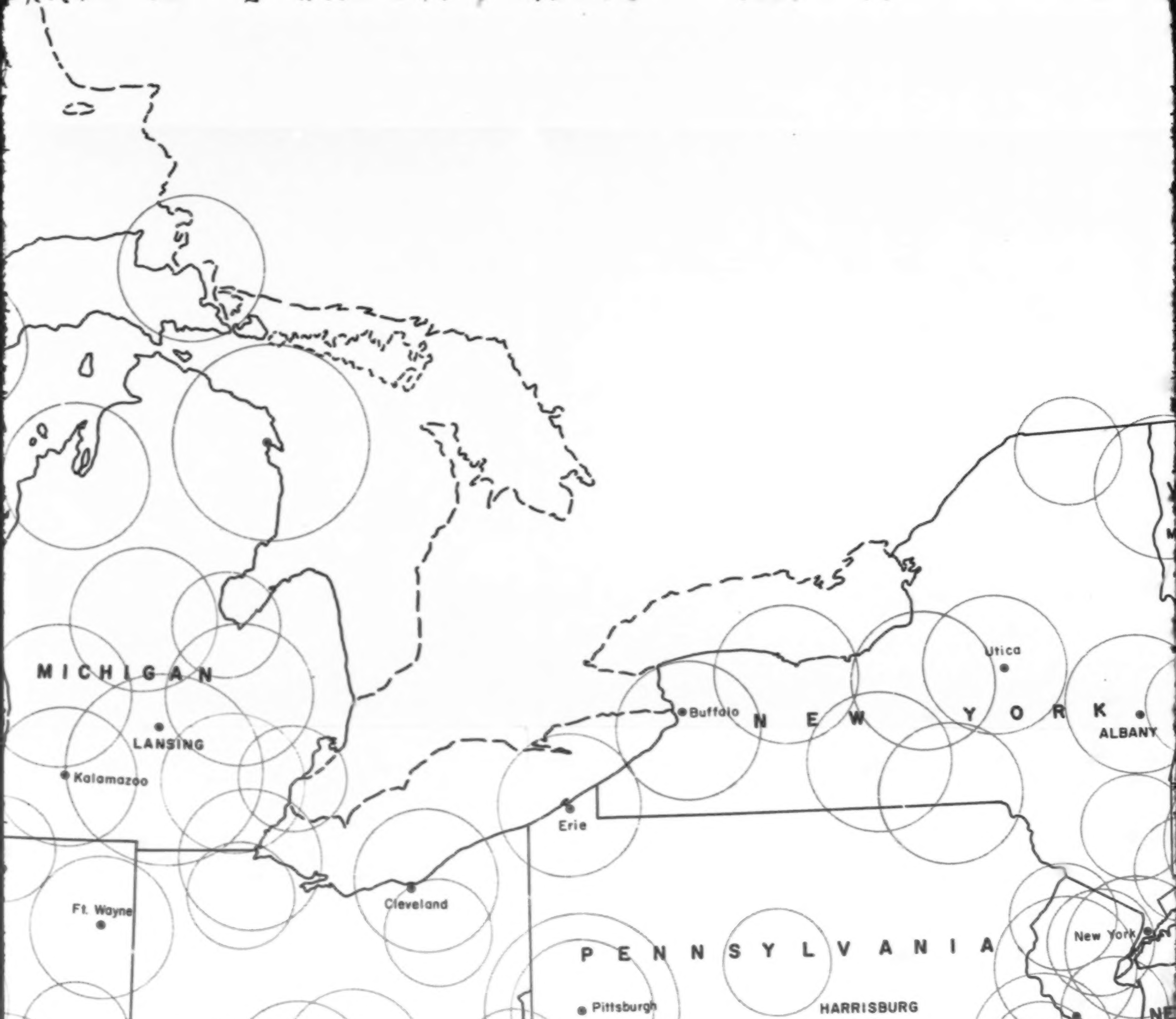
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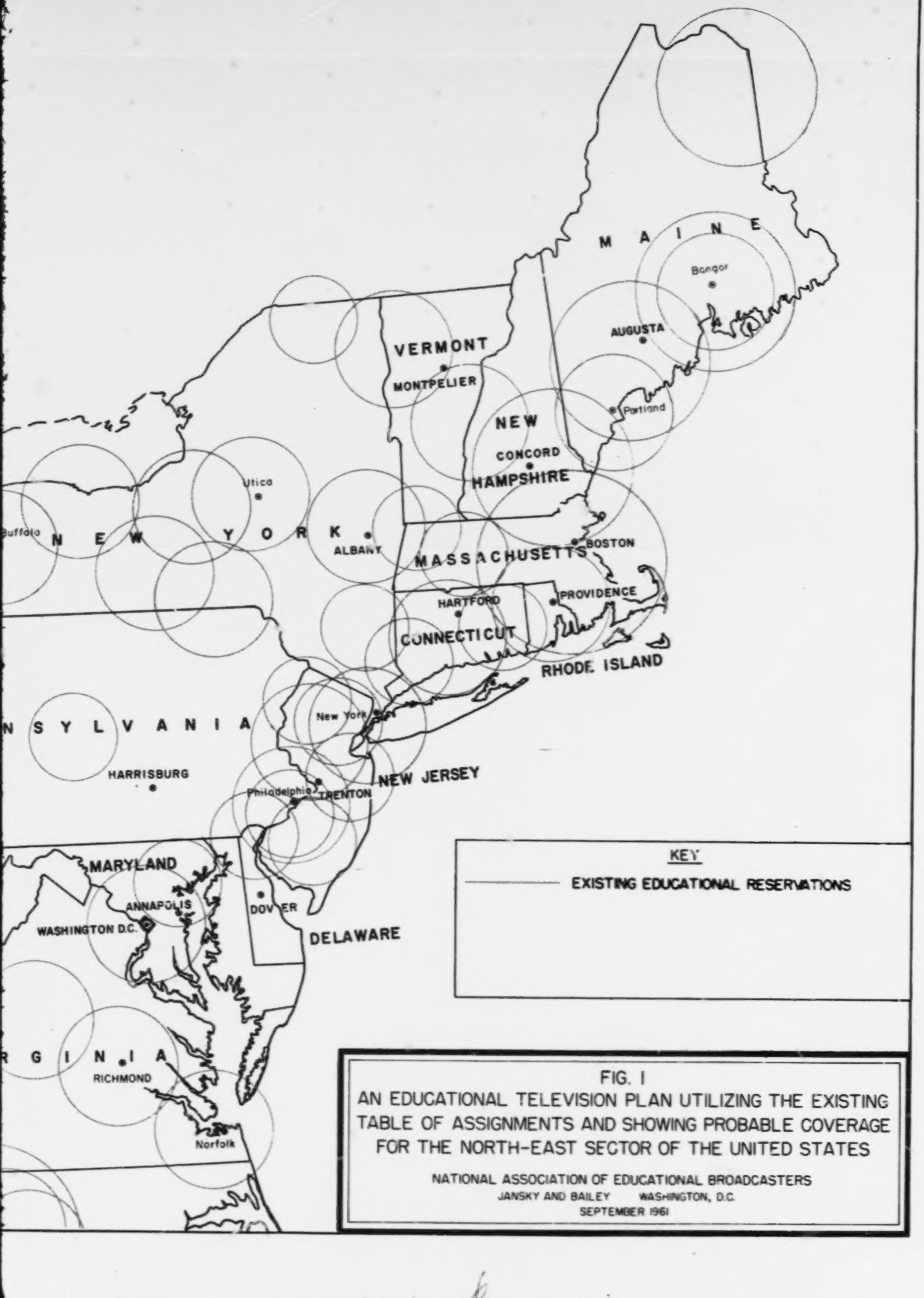
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FIG. 1
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-EAST SECTOR OF THE UNITED STATES

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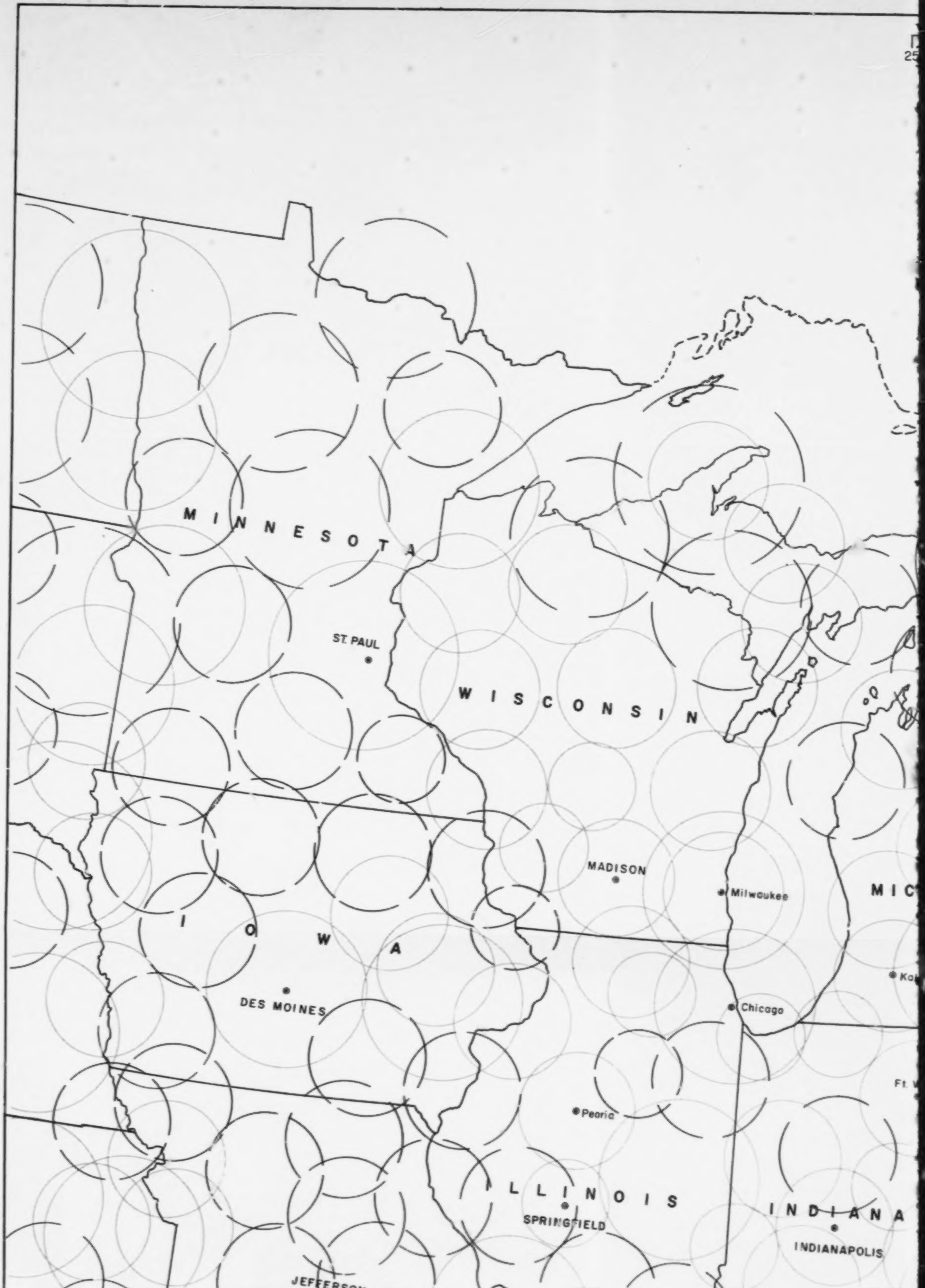
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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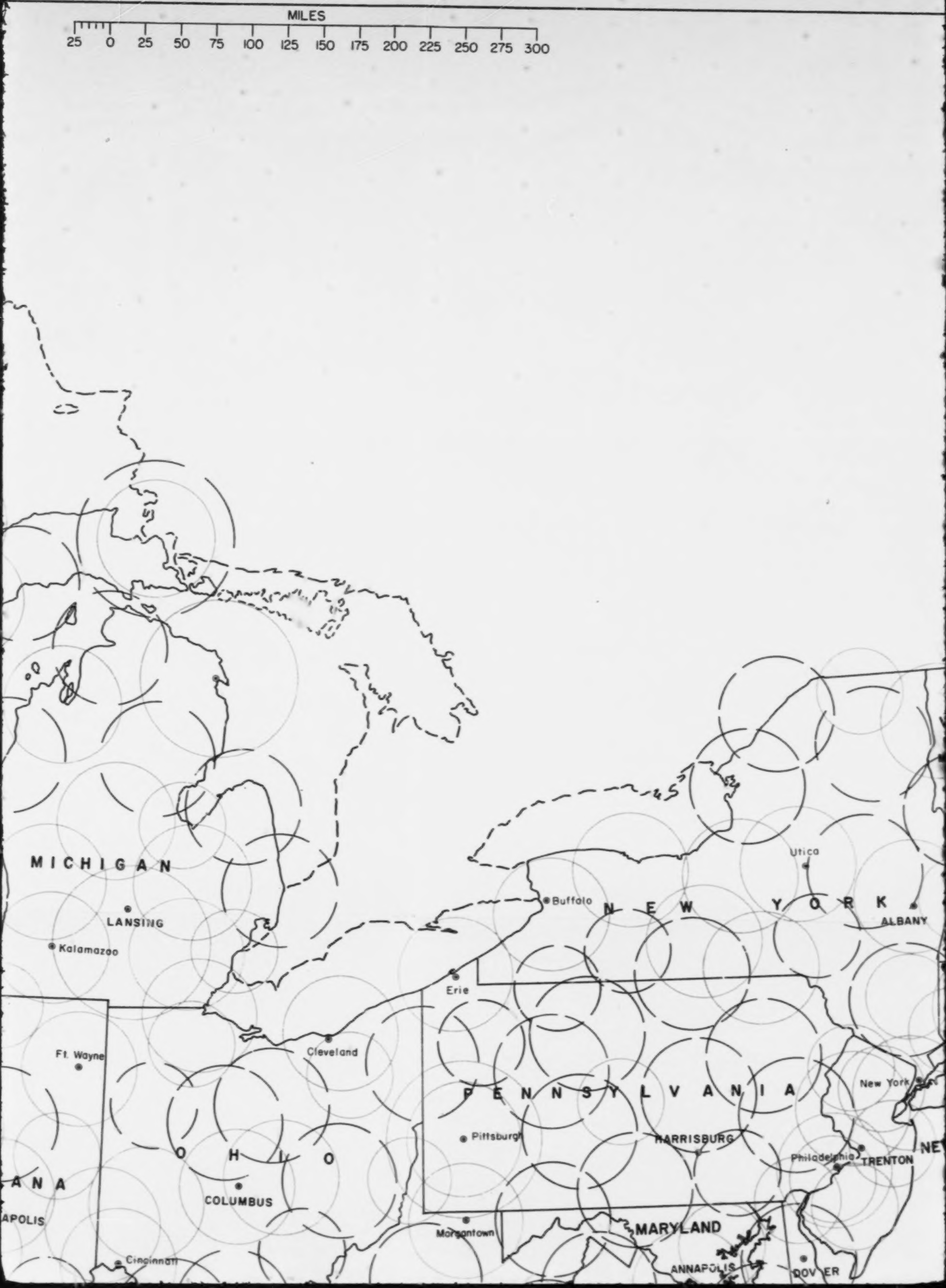
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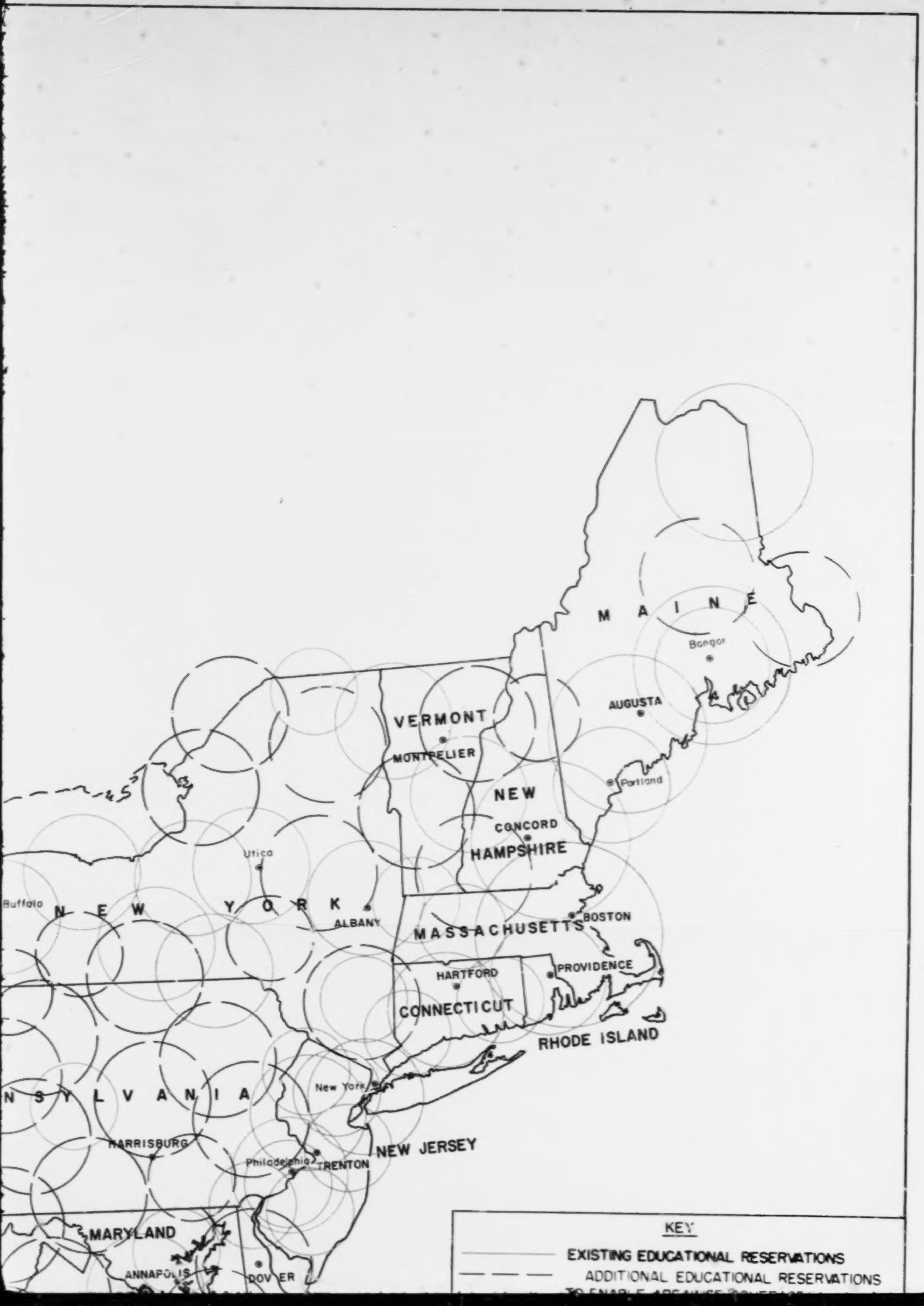
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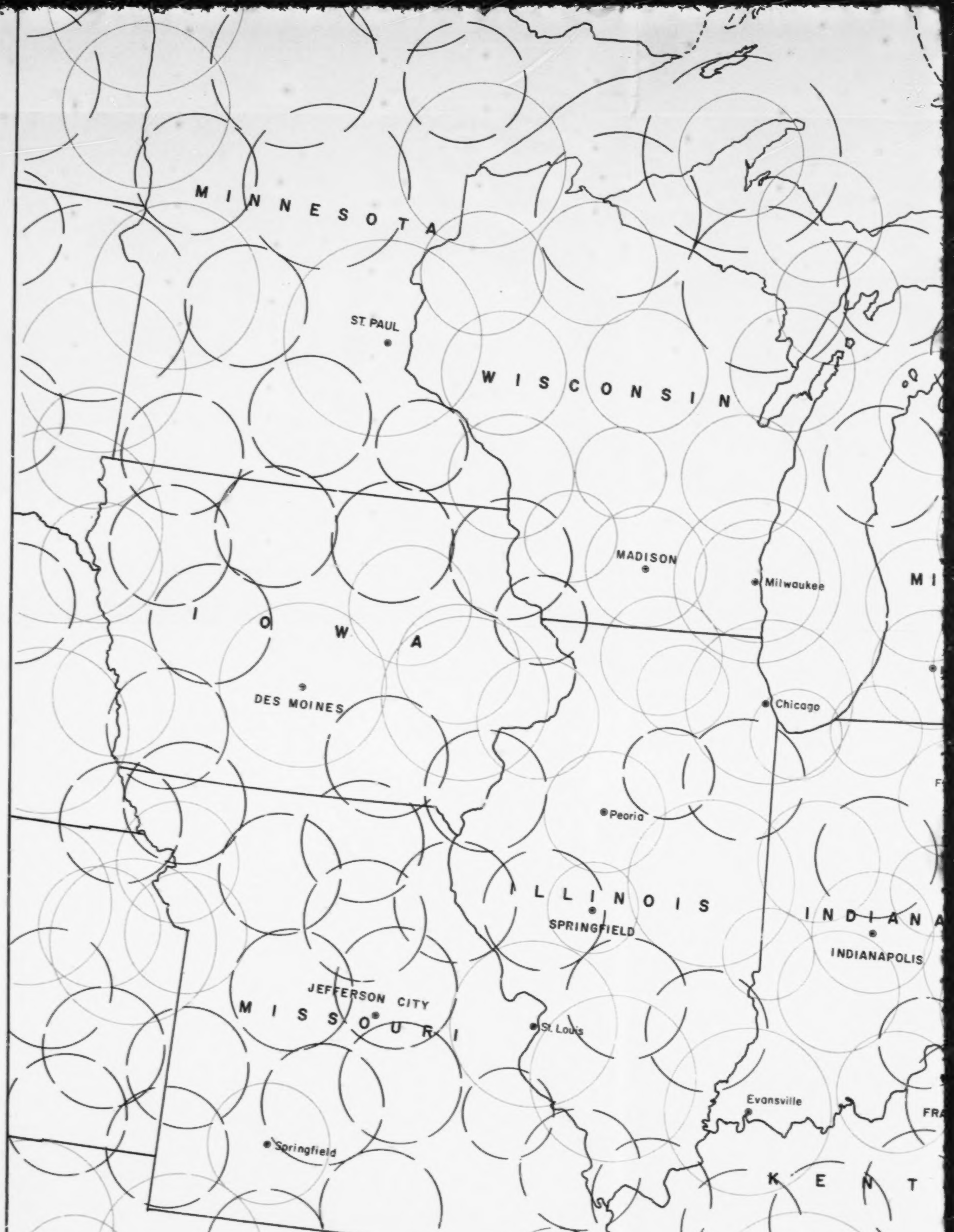
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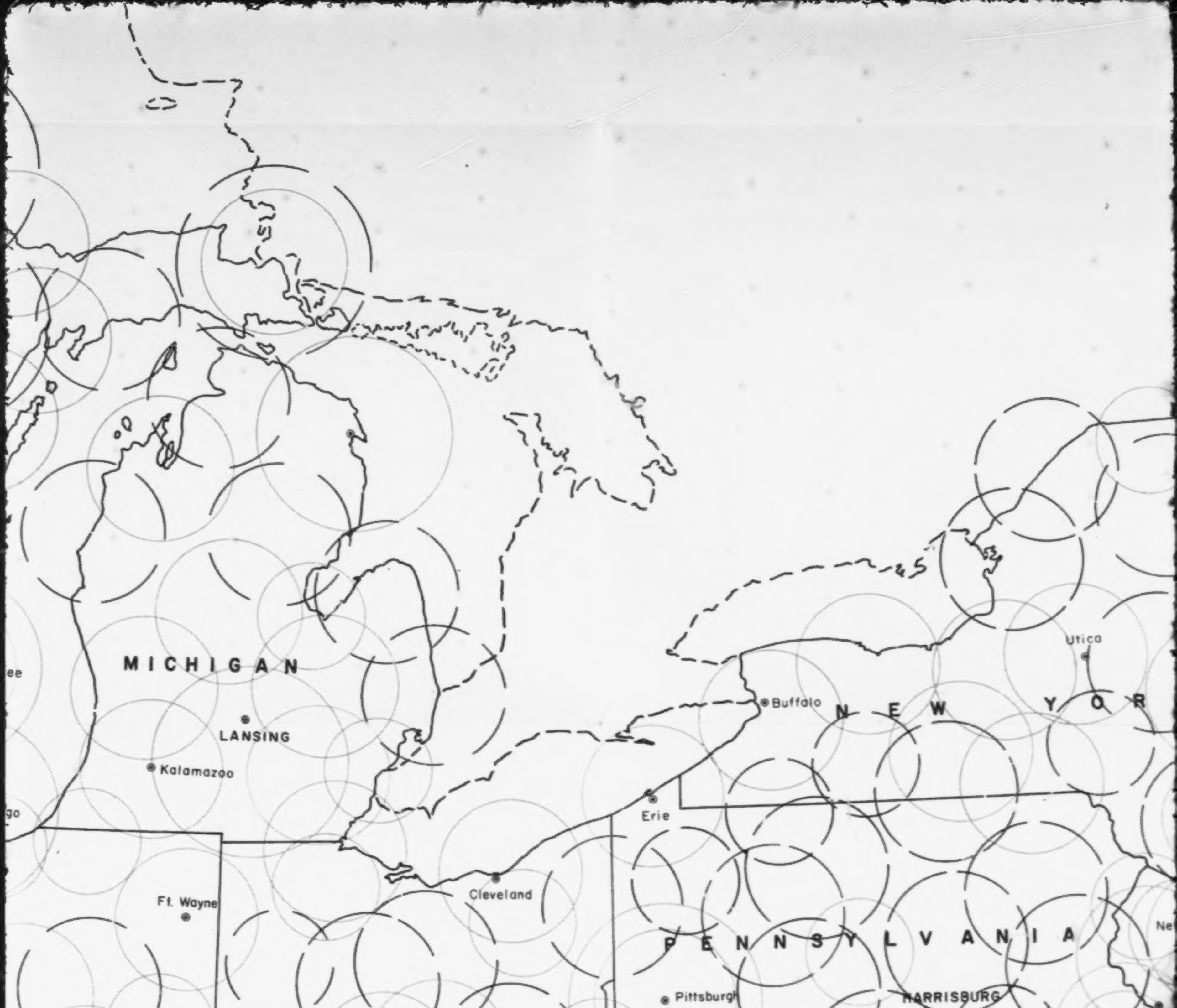
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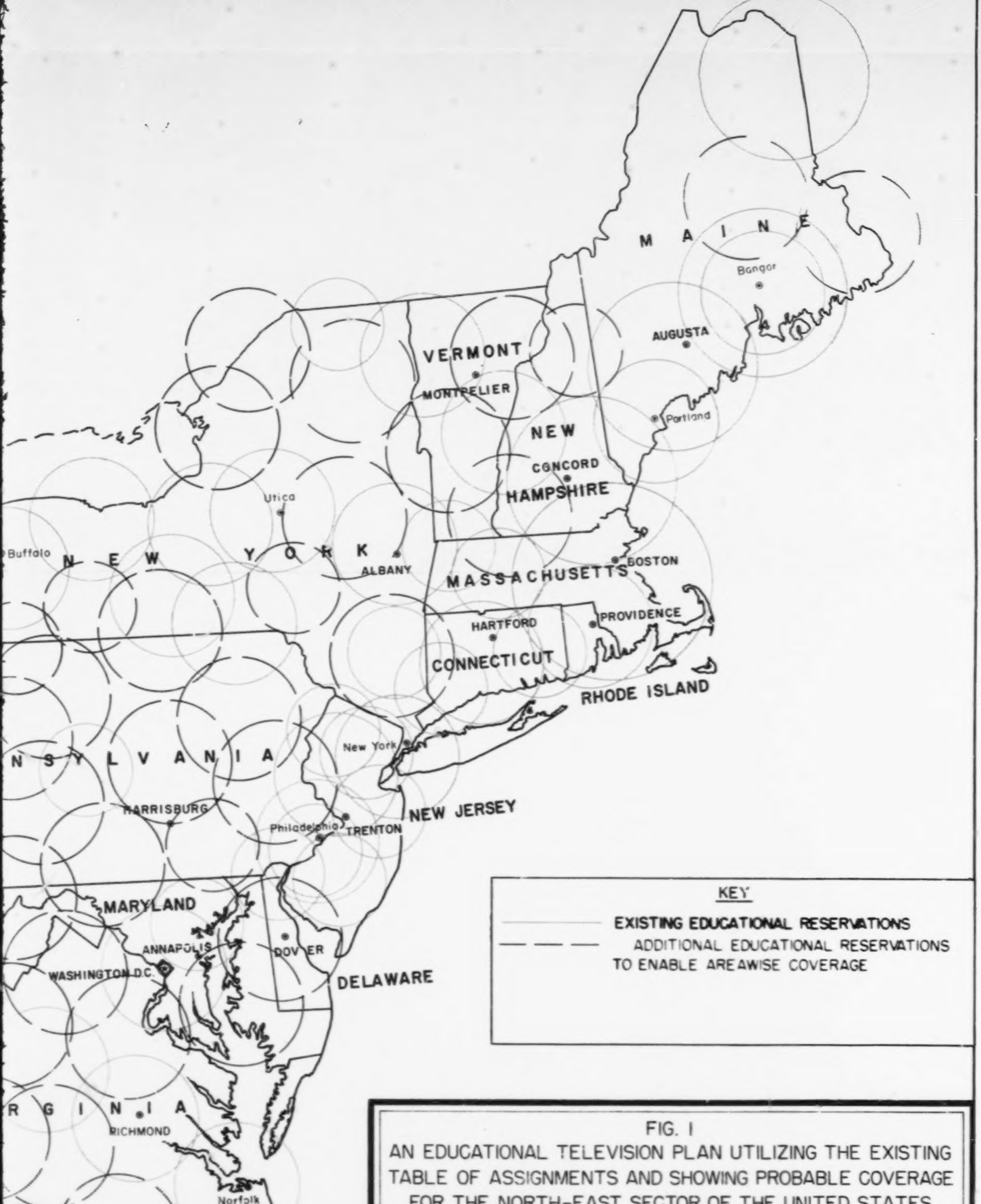
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FIG. 1
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-EAST SECTOR OF THE UNITED STATES

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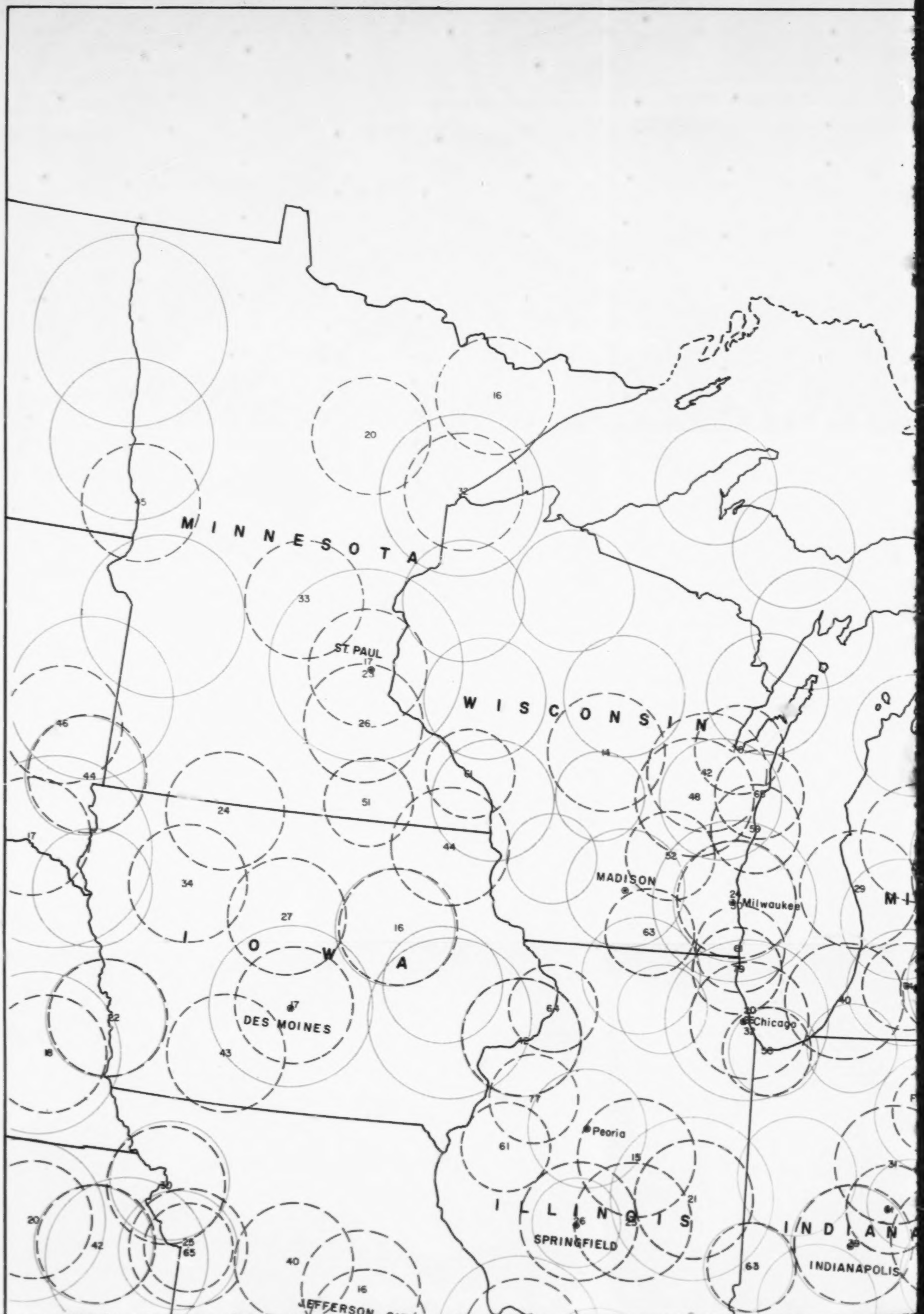
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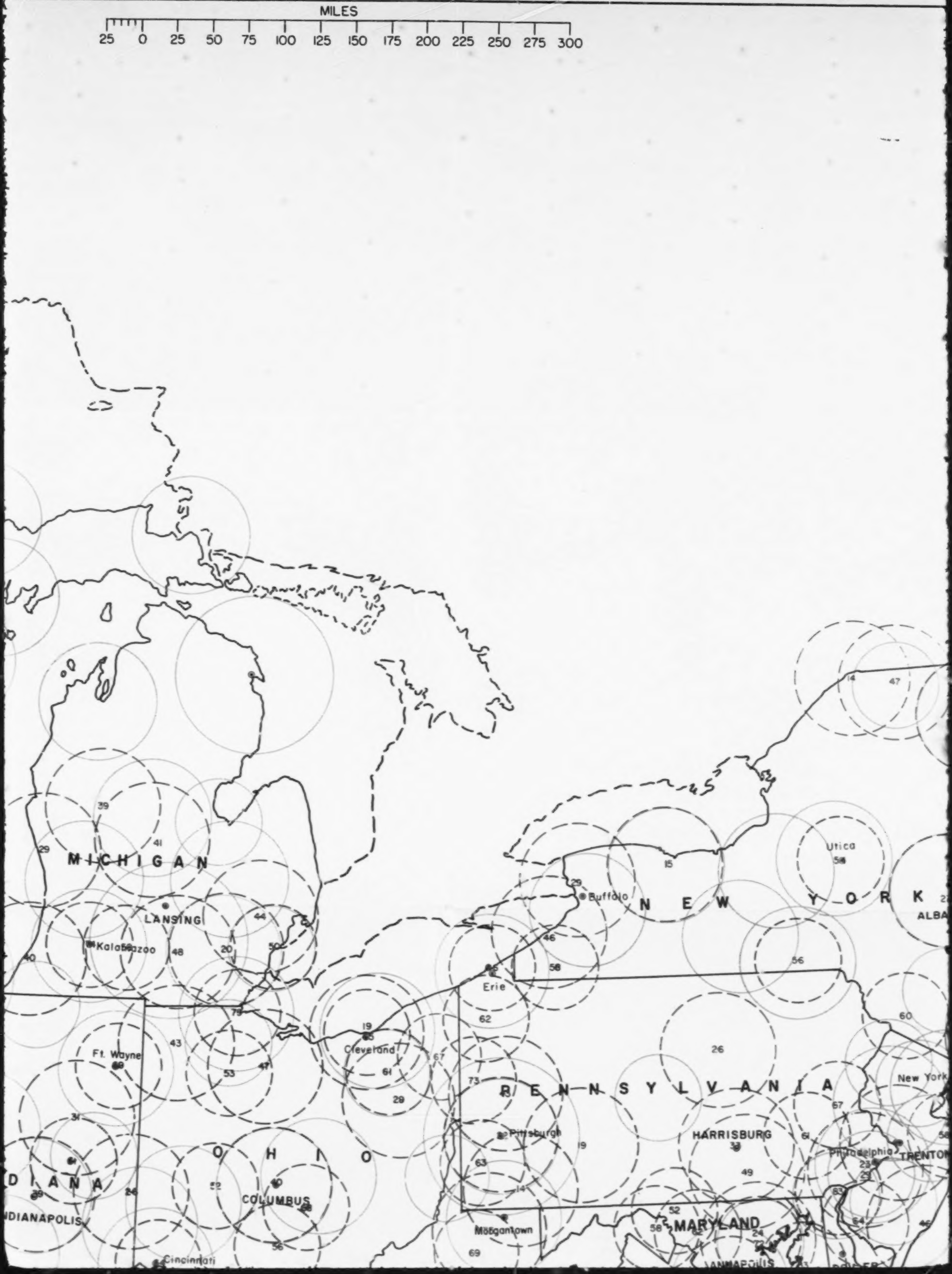
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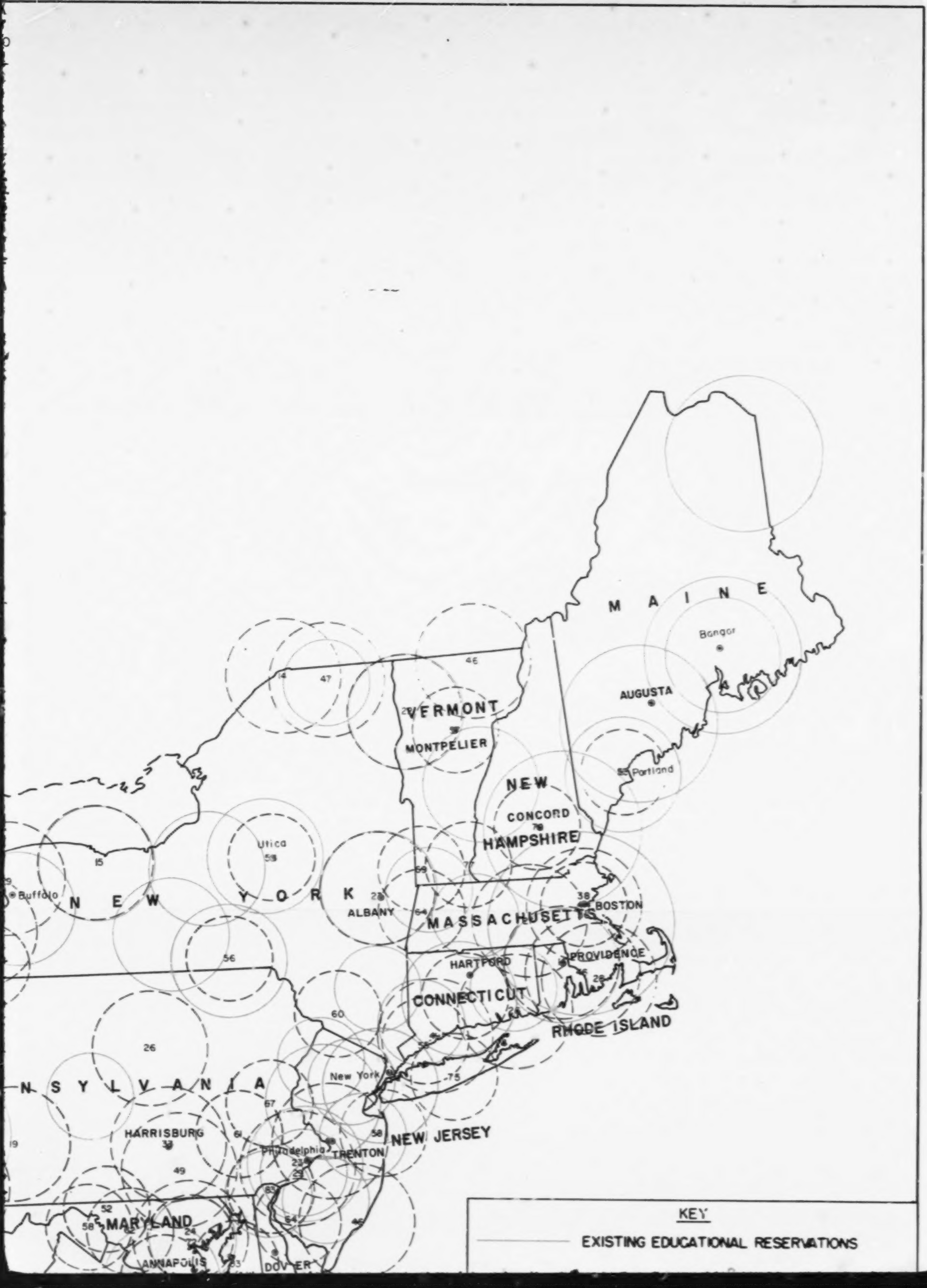
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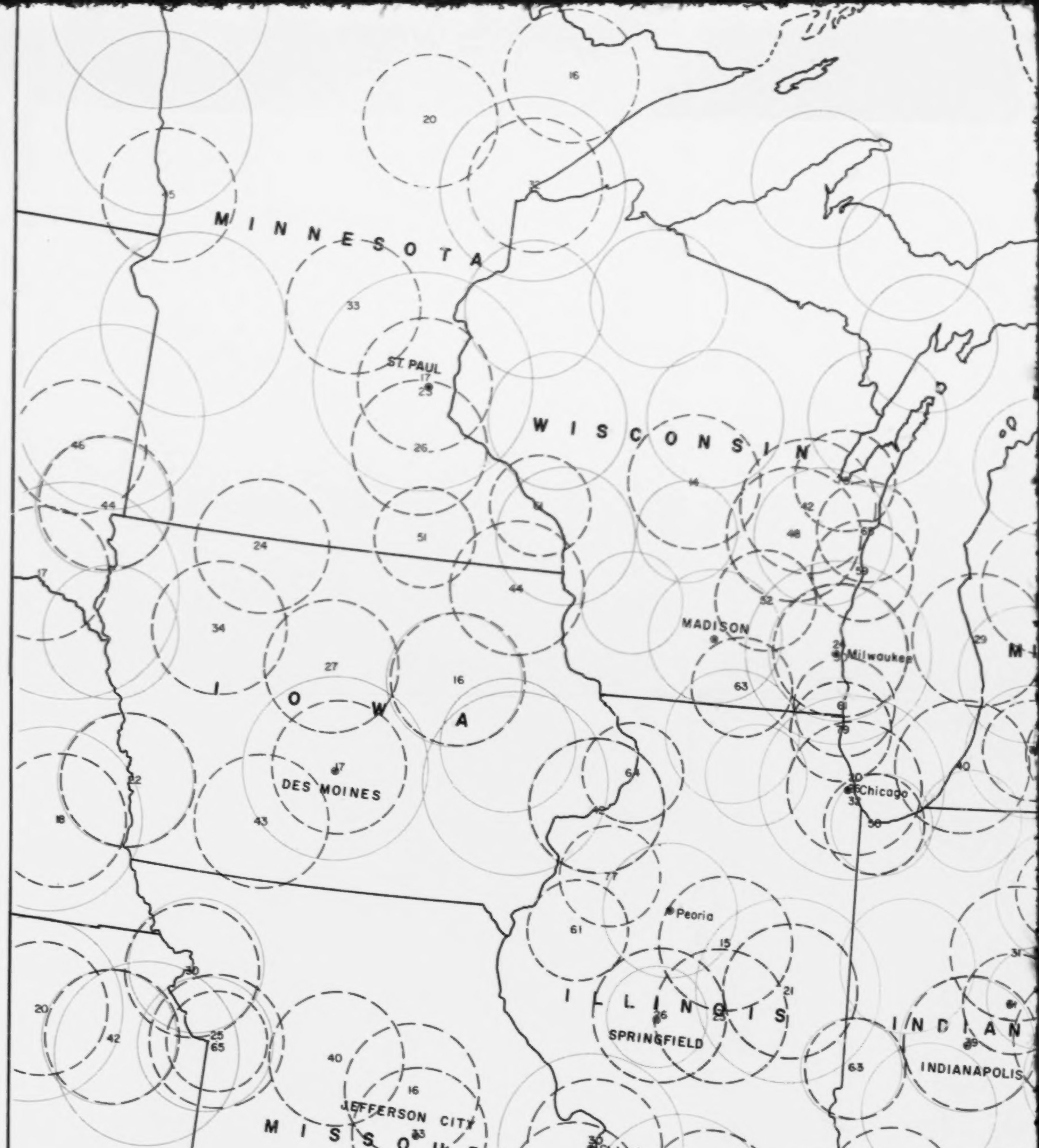
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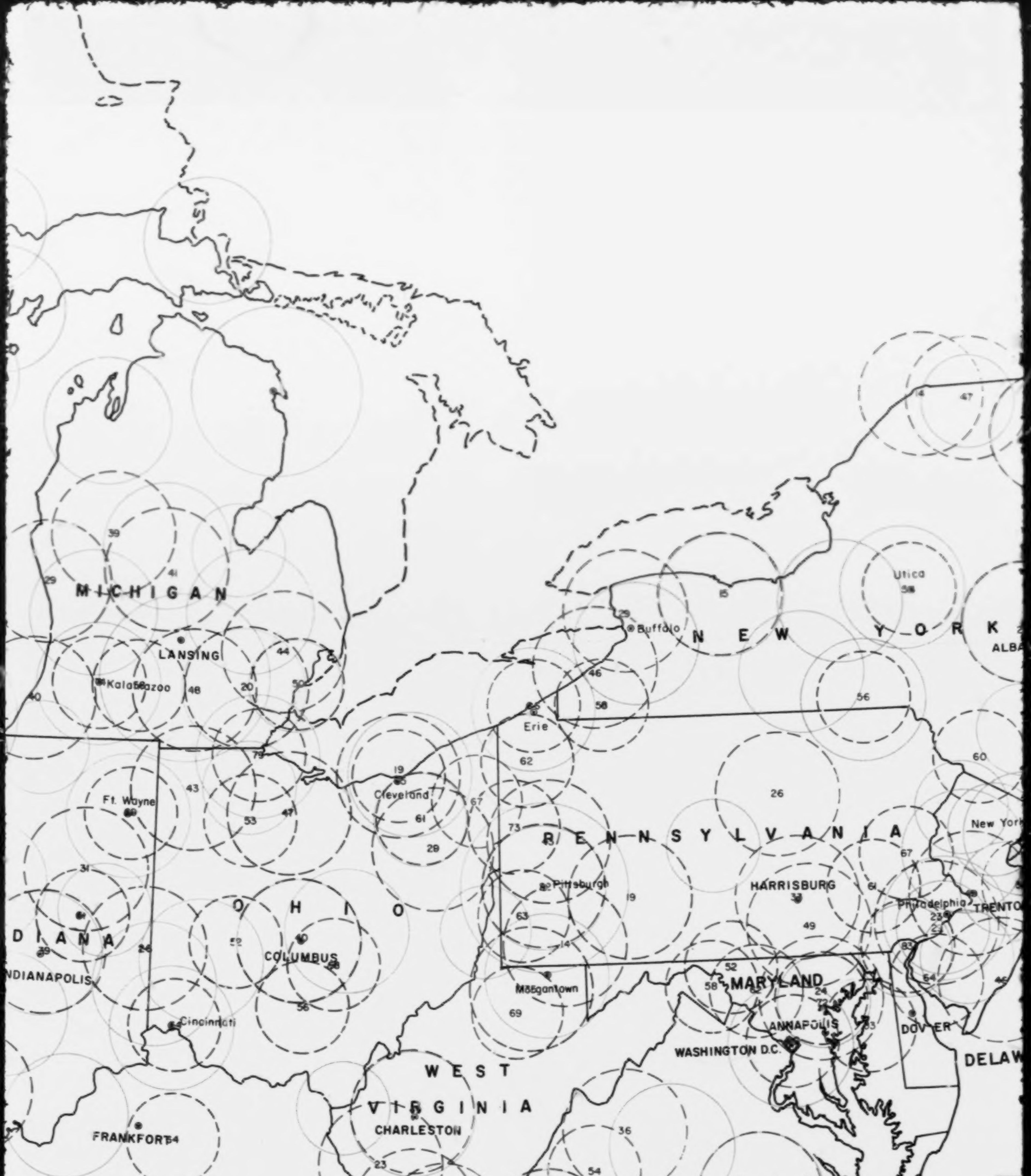
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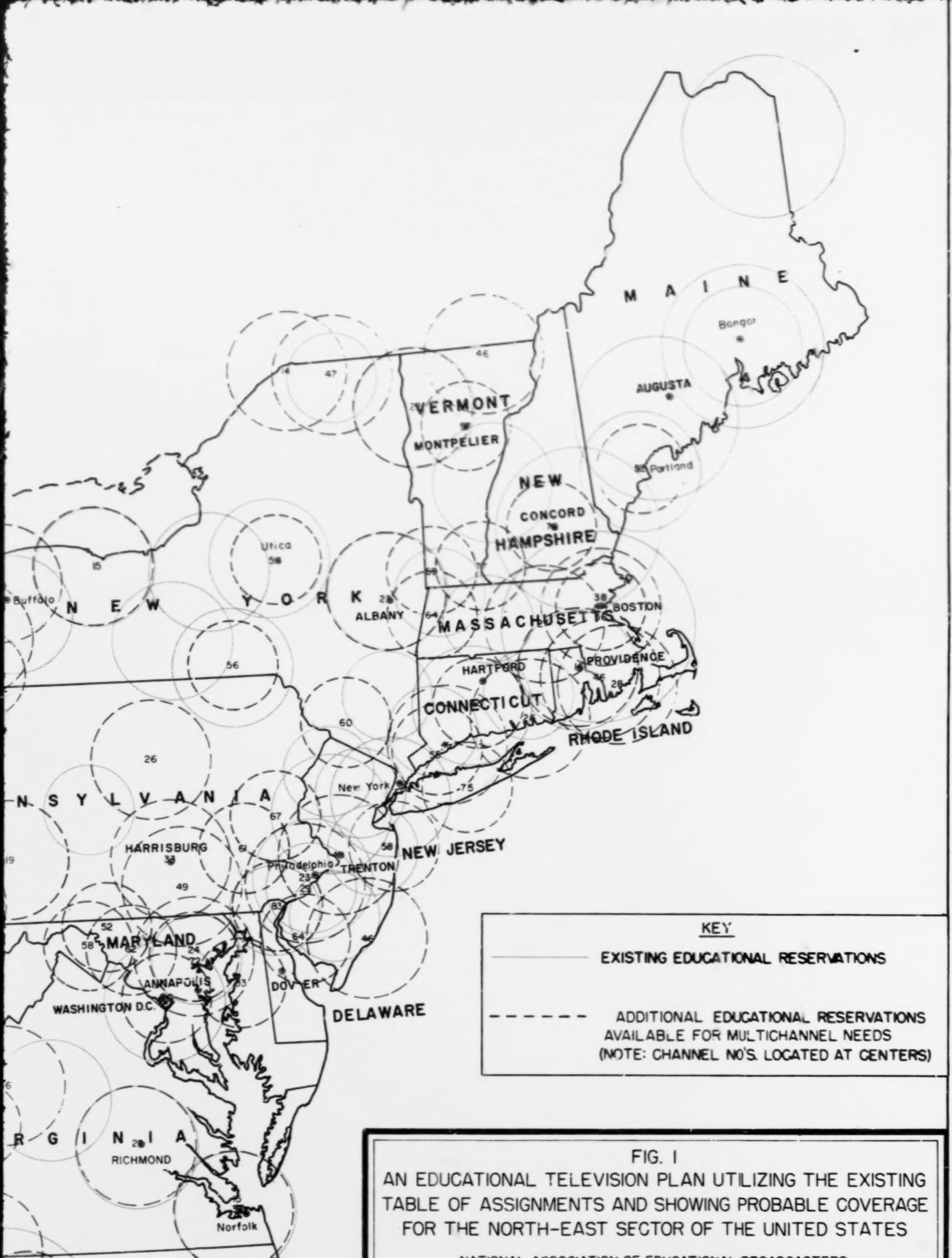
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ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS
(NOTE: CHANNEL NO'S. LOCATED AT CENTERS)

FIG. 1

AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
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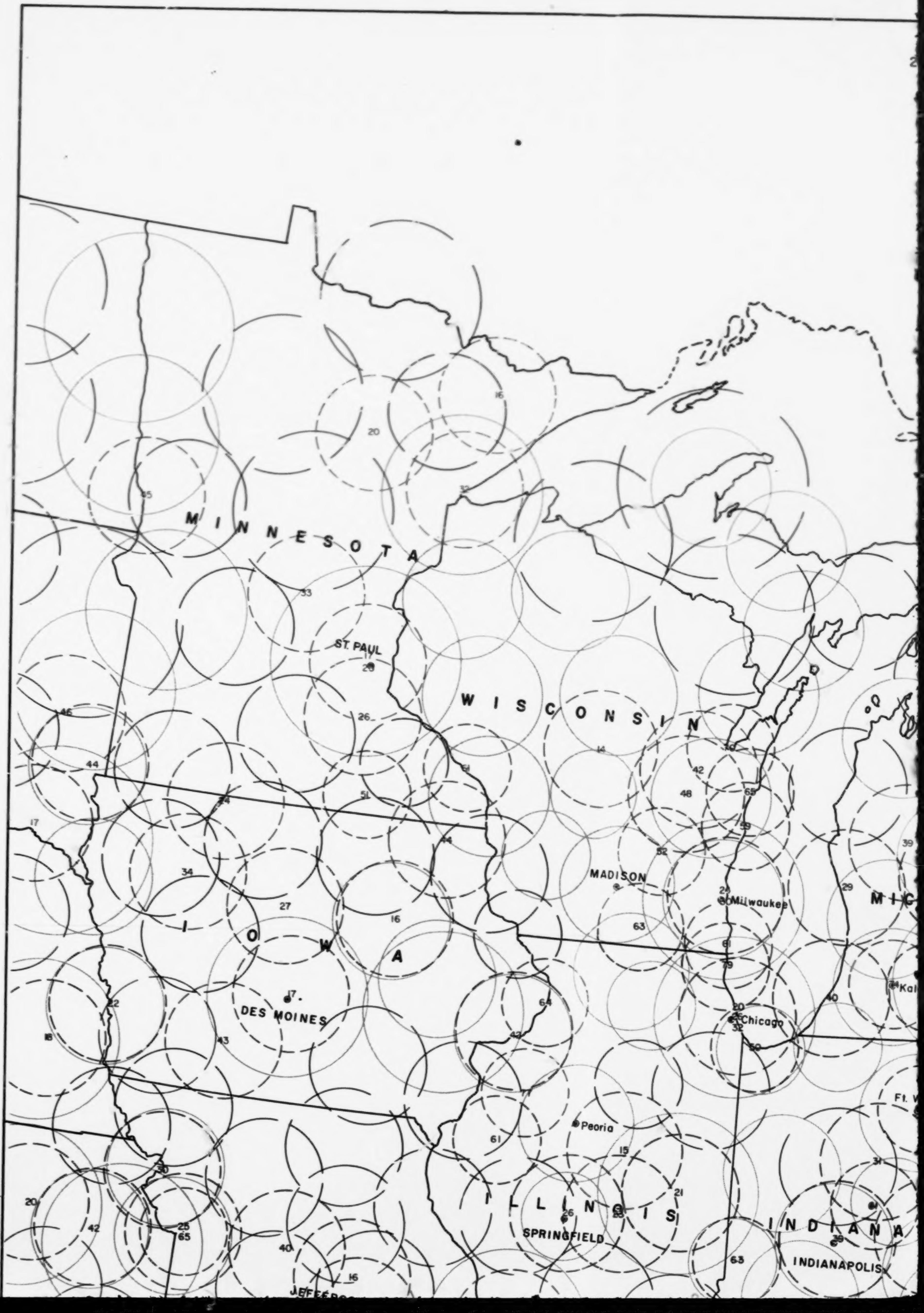
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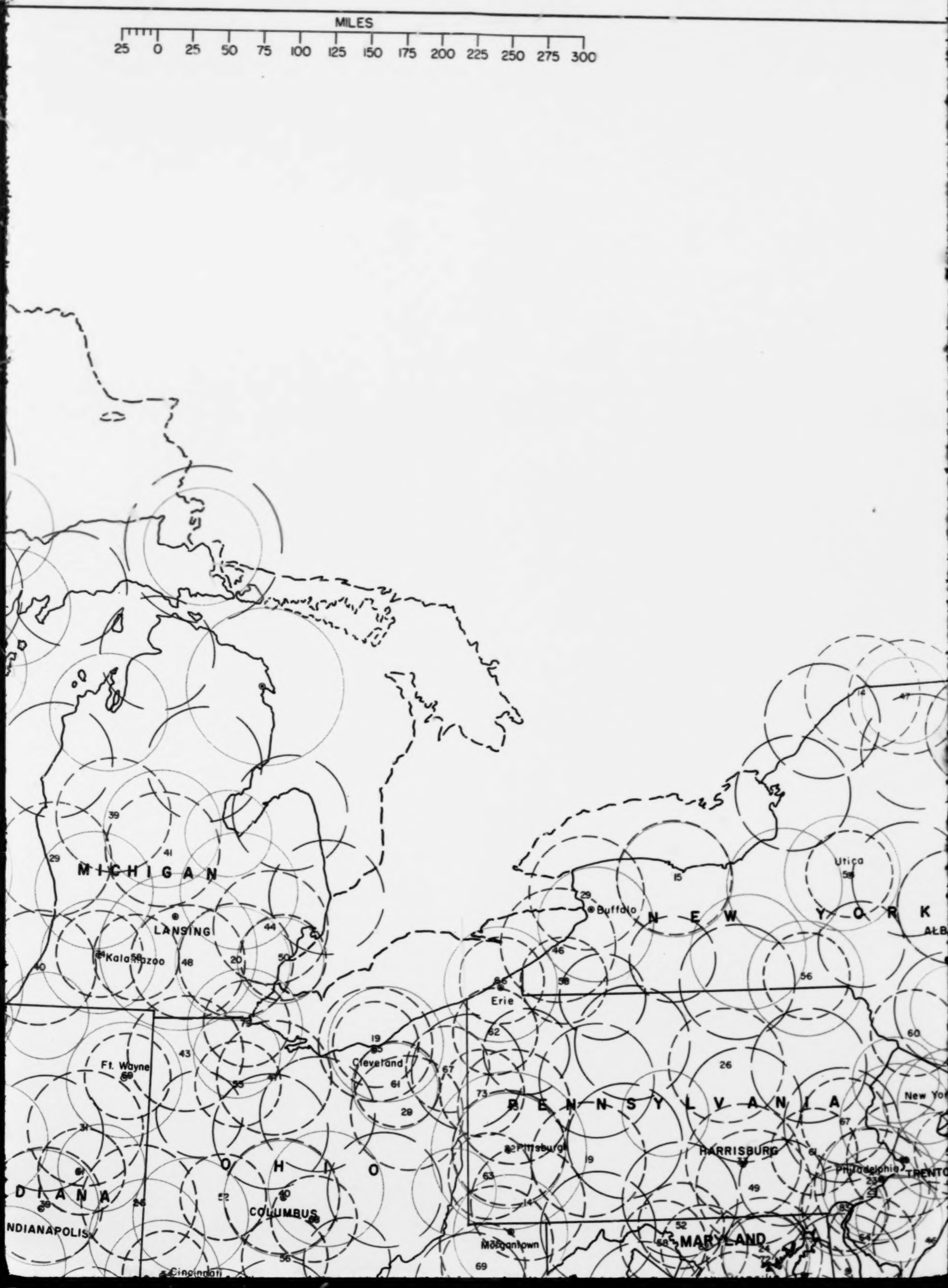
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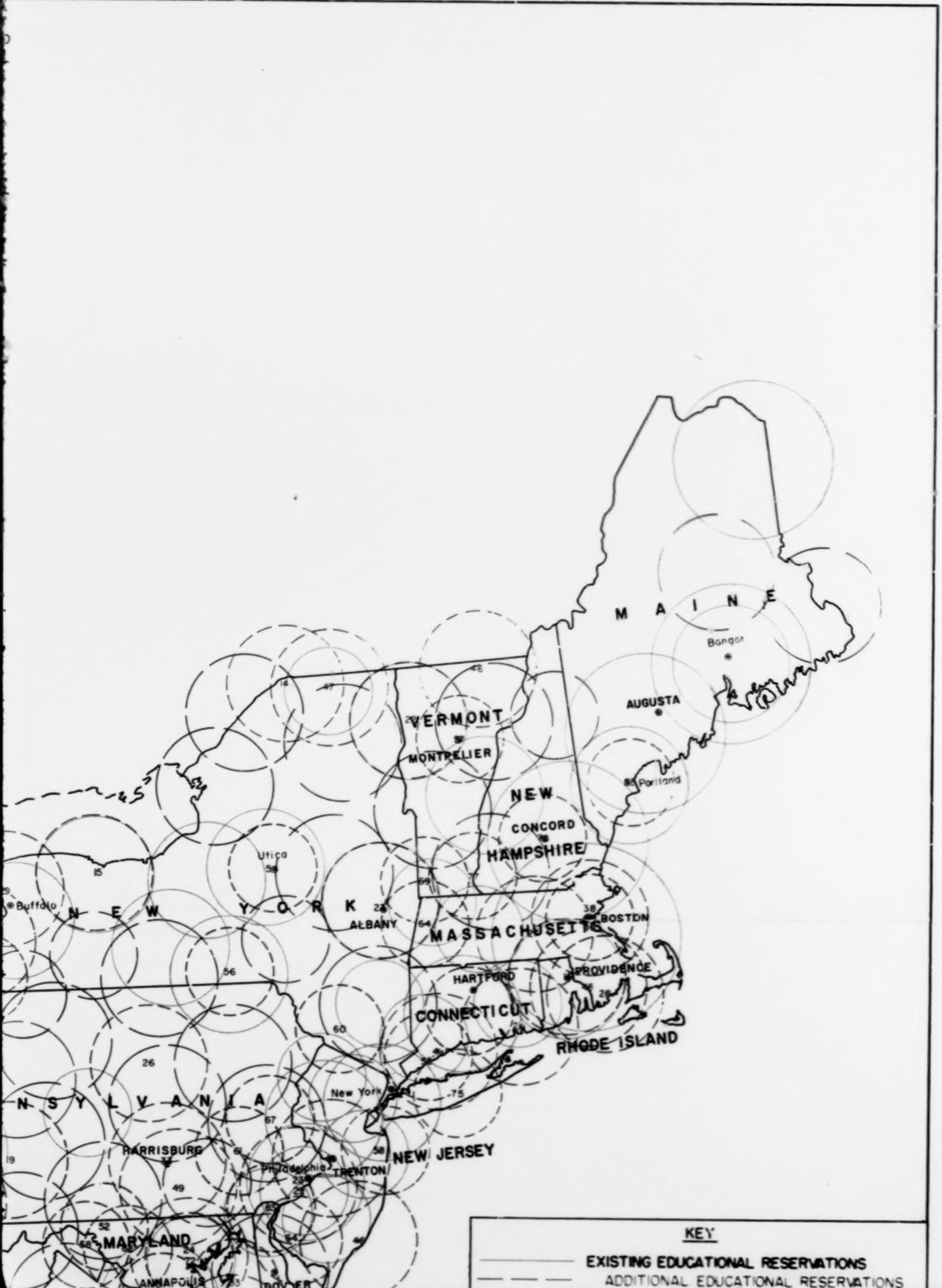
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KEY
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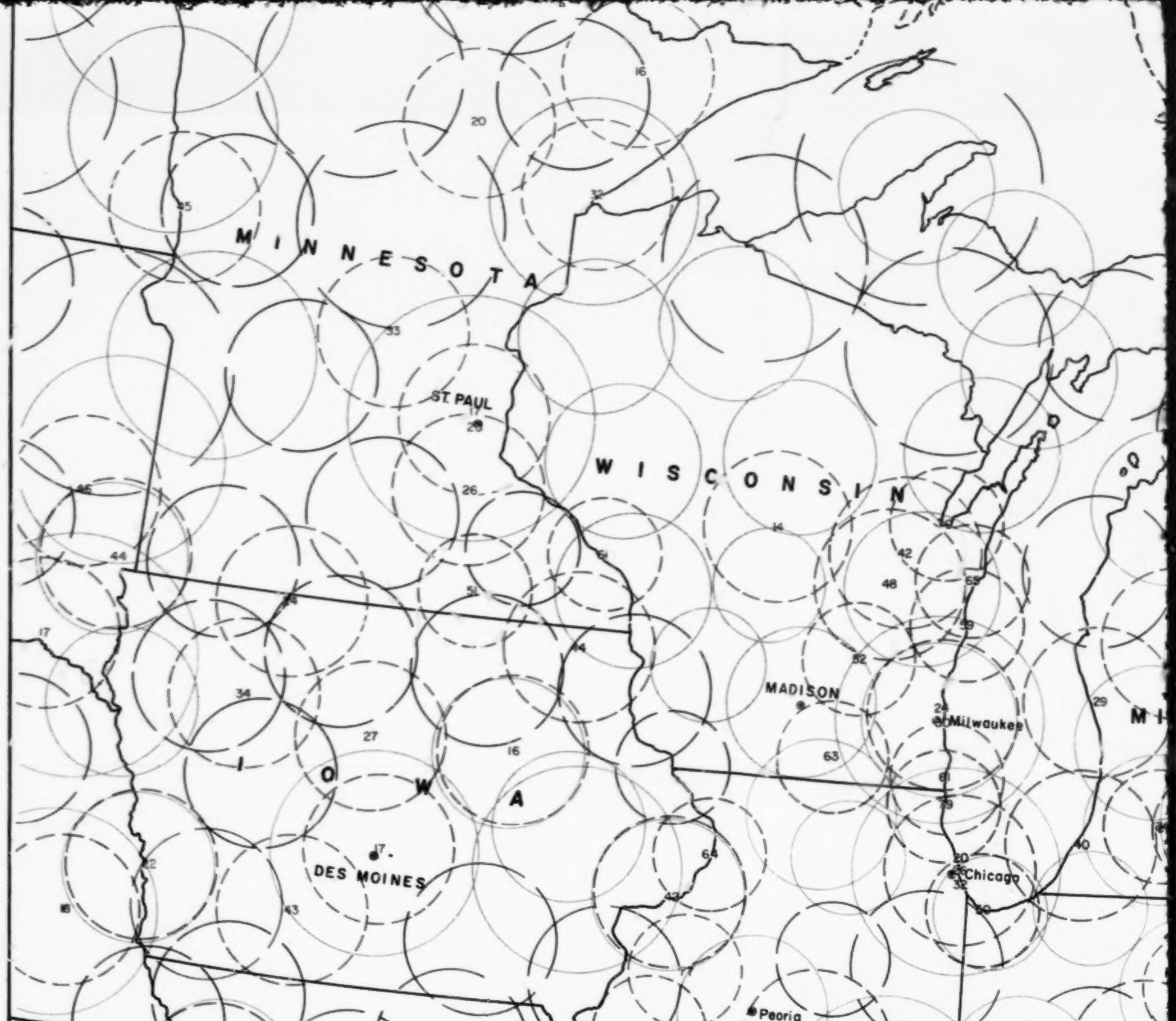
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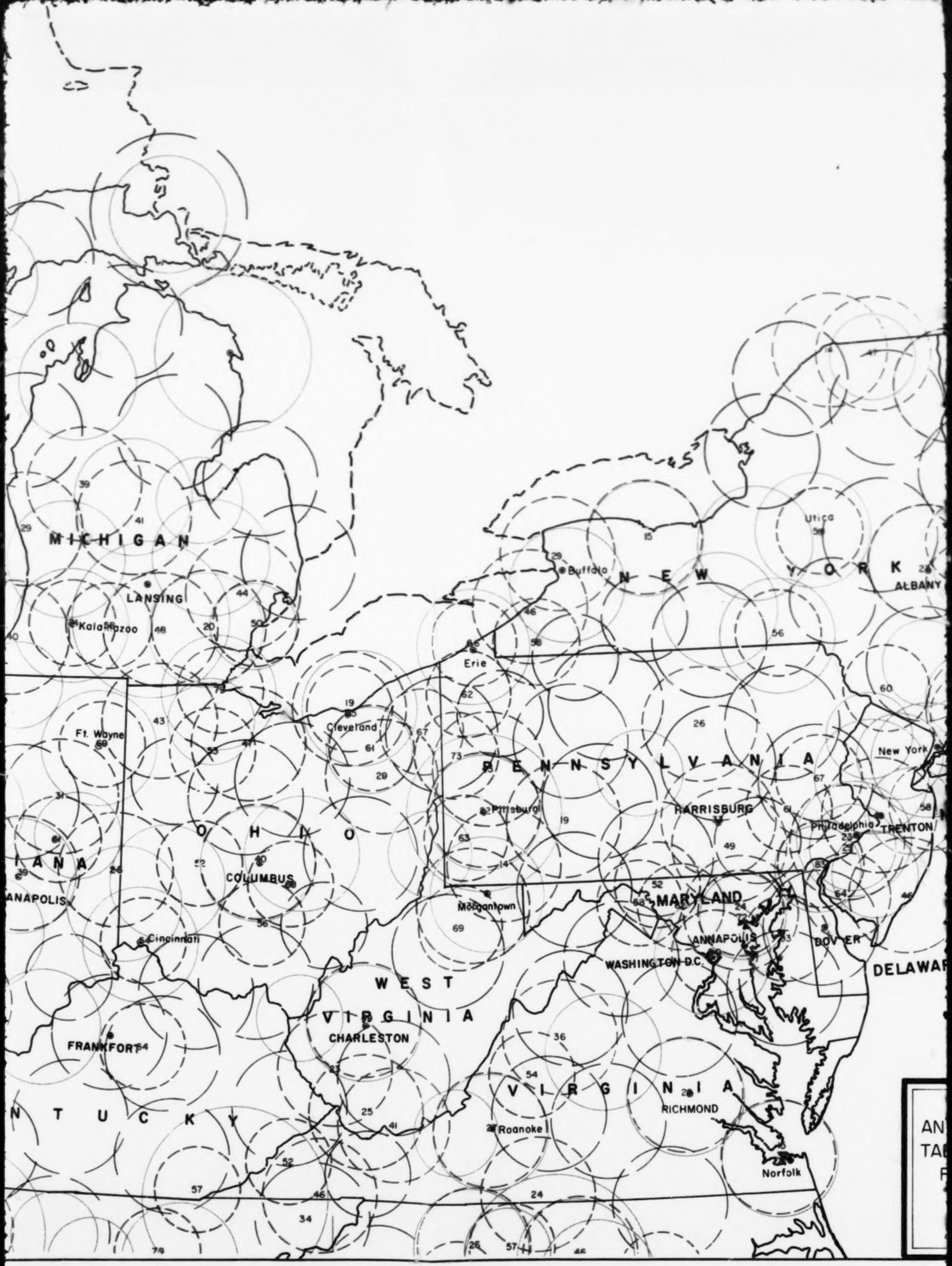
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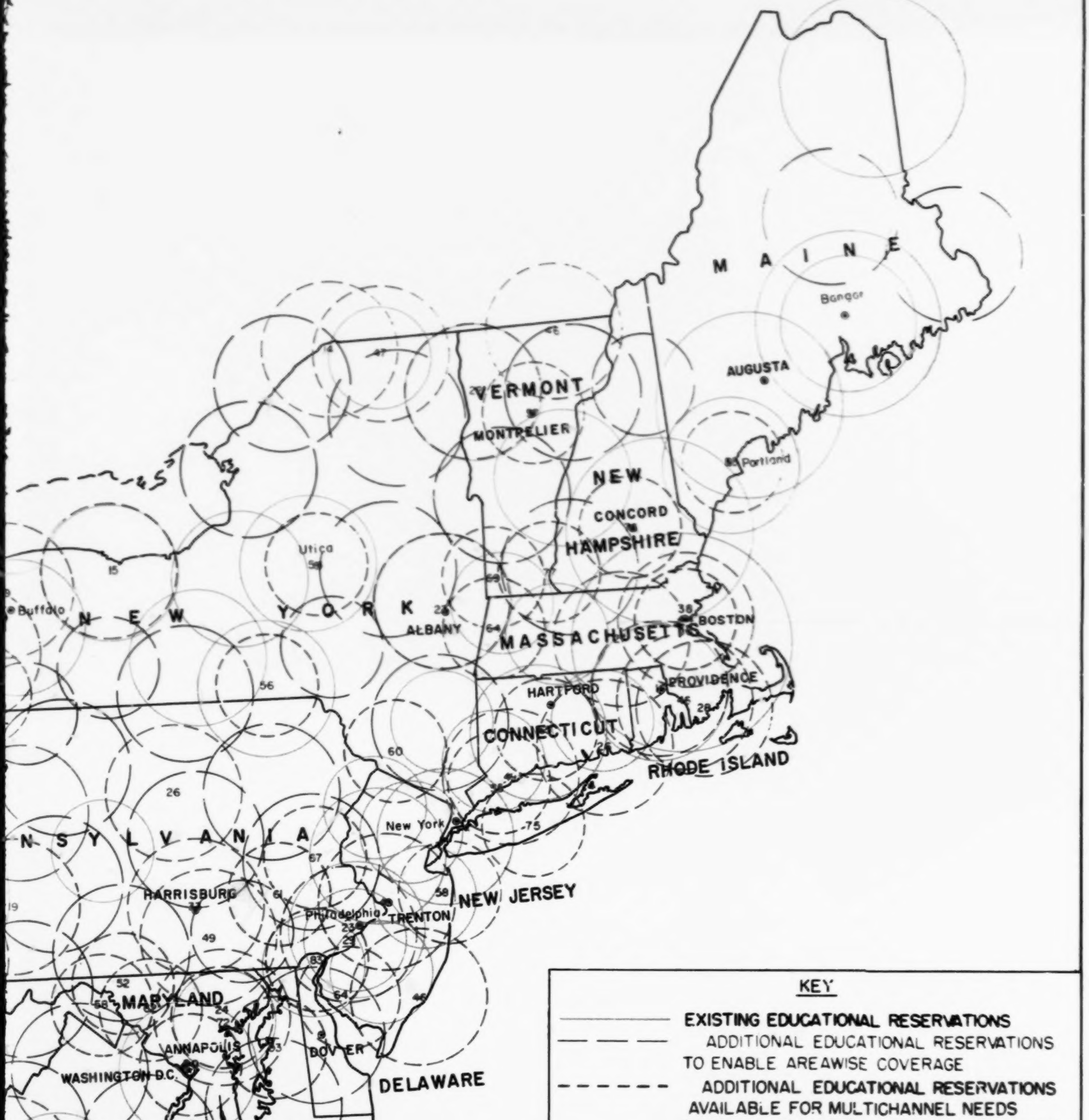
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KEY
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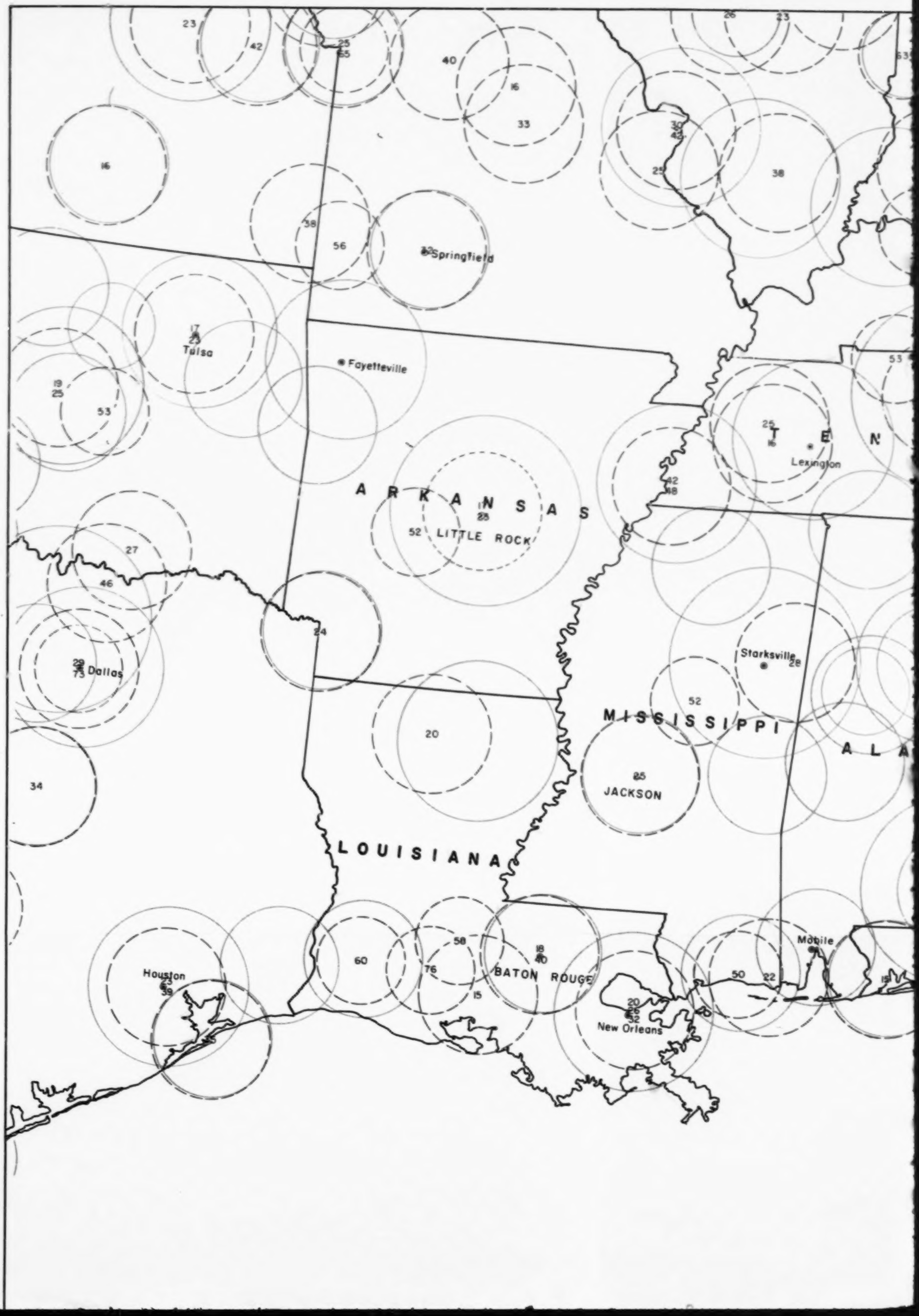
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS
(NOTE: CHANNEL NO'S. LOCATED AT CENTERS)

FIG. I

AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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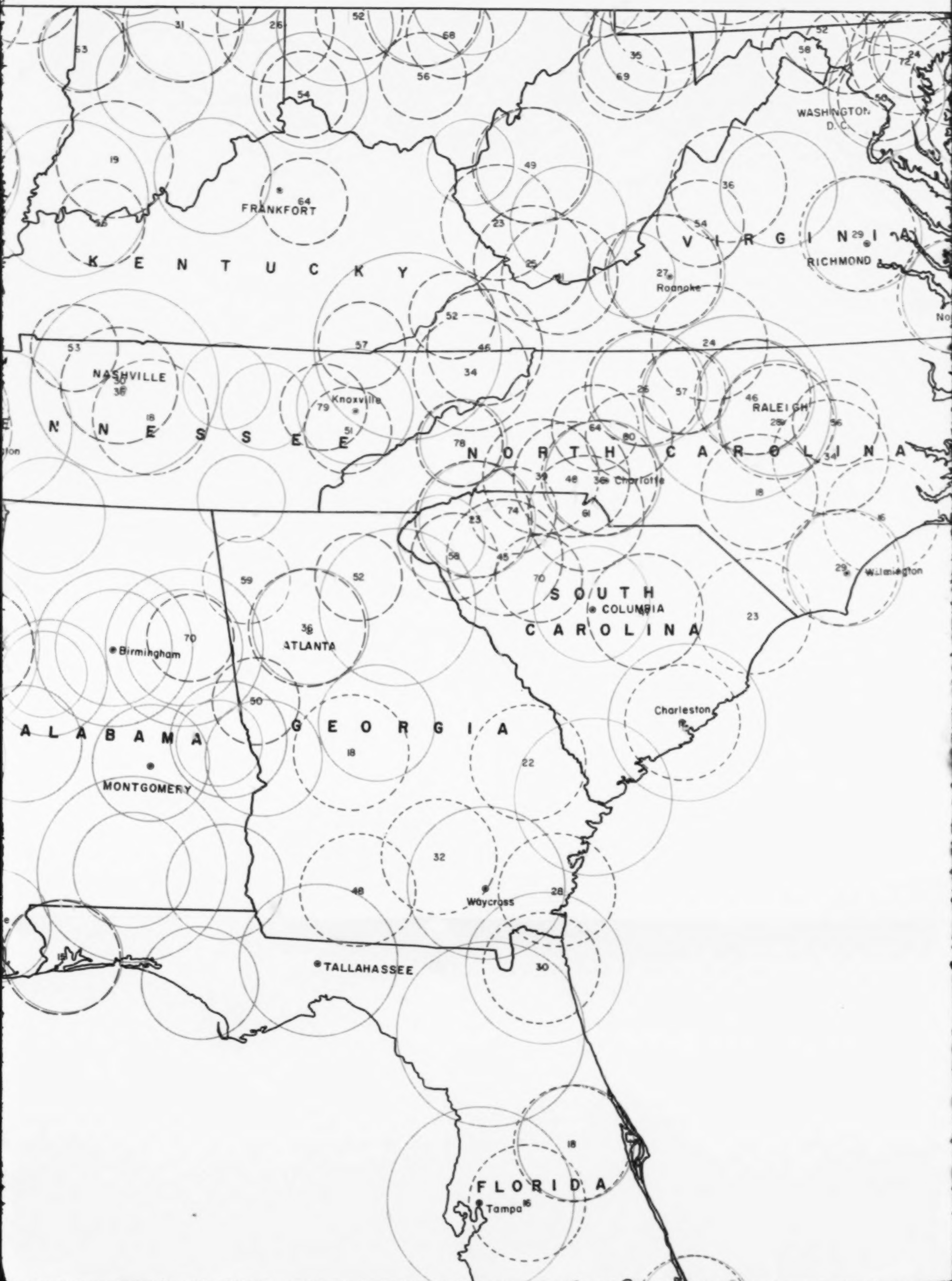

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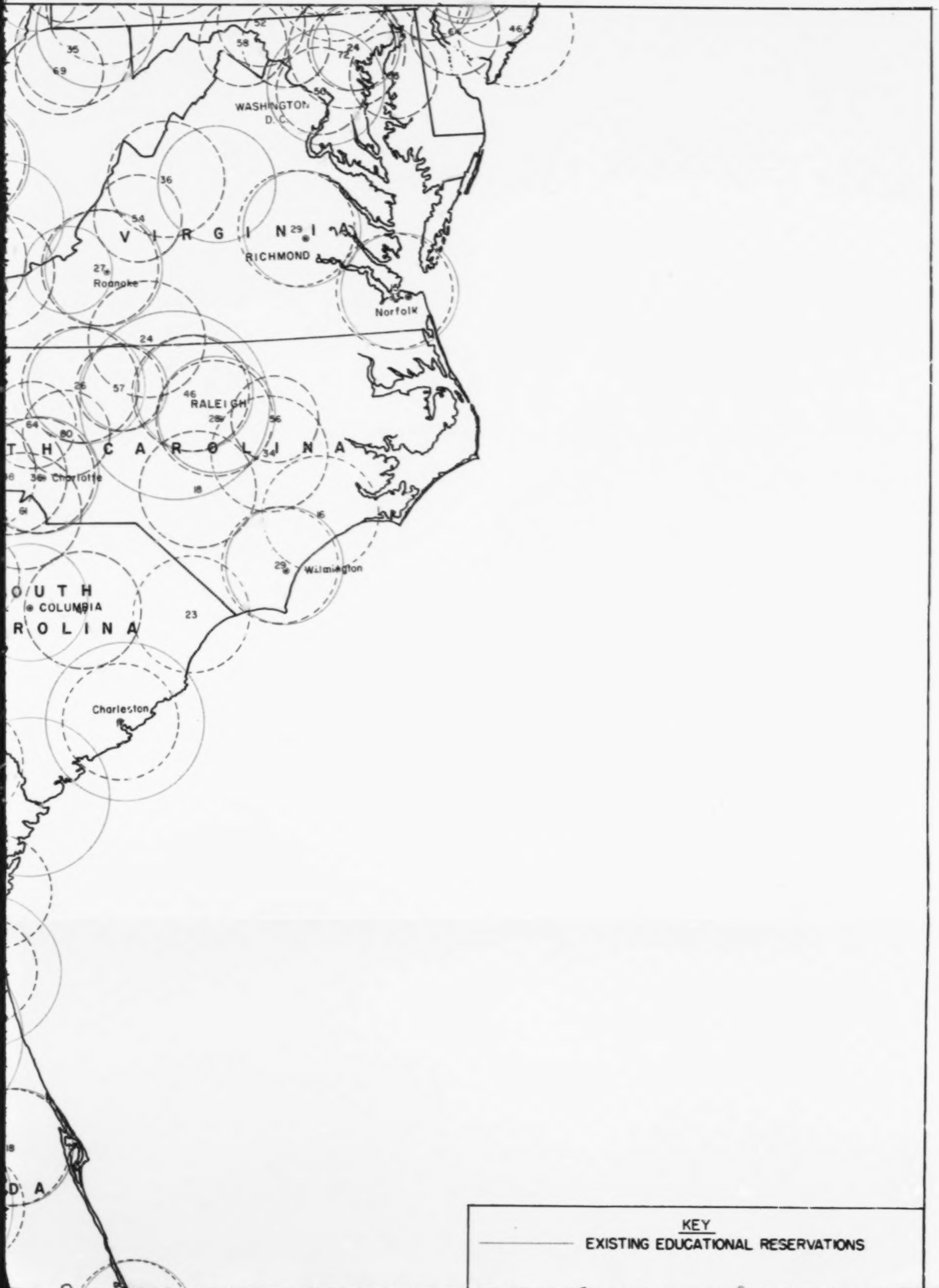
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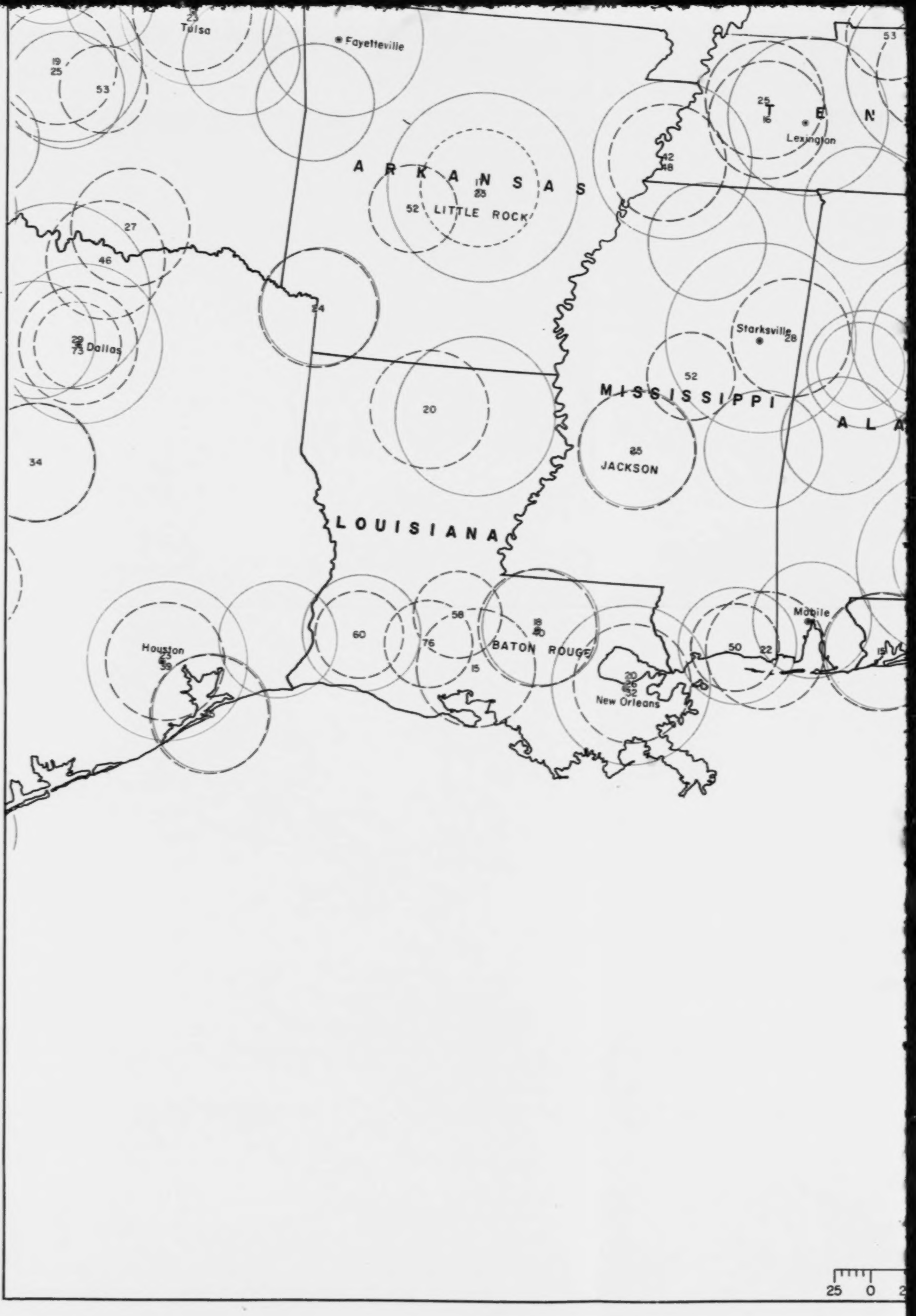
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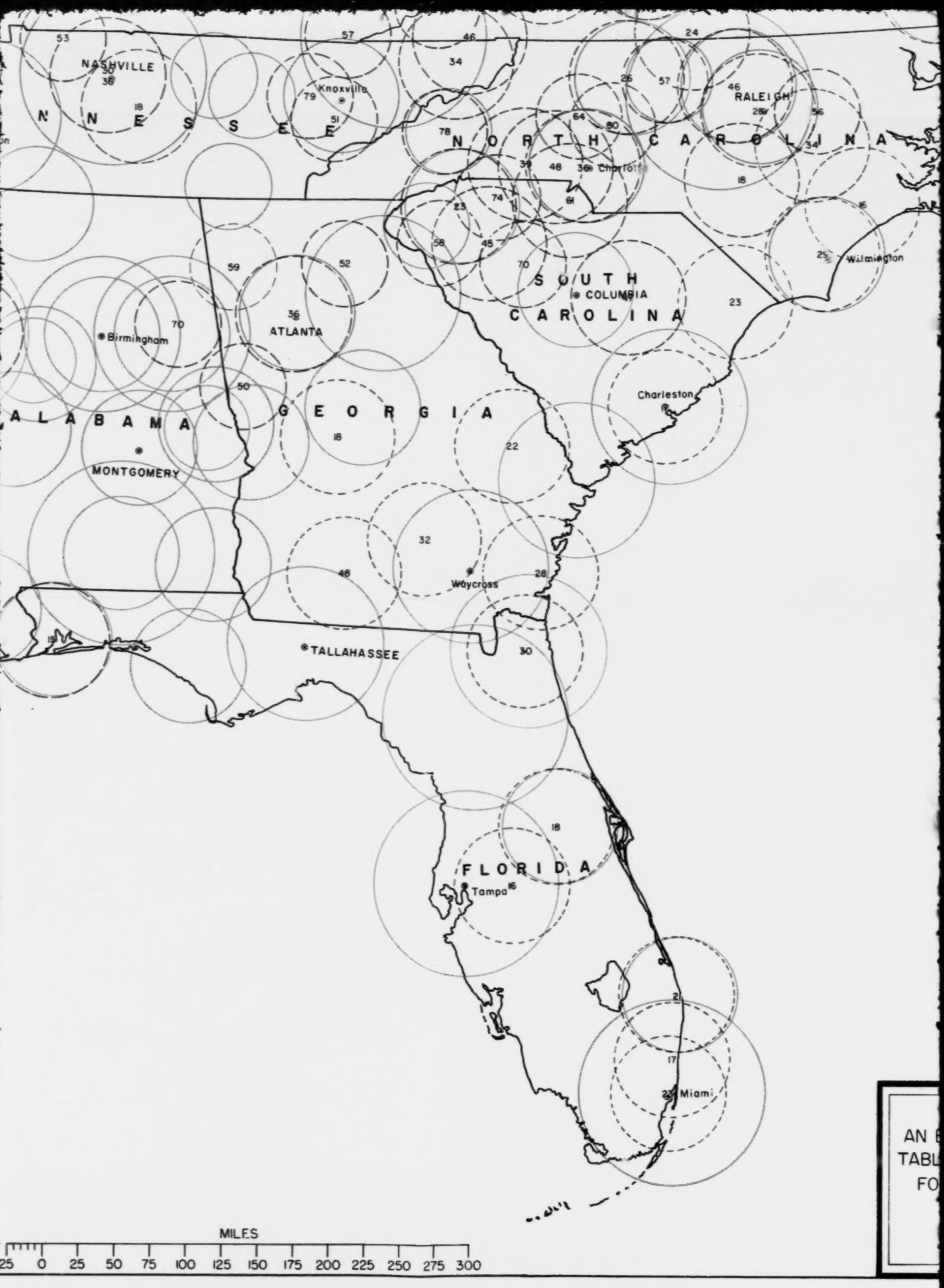
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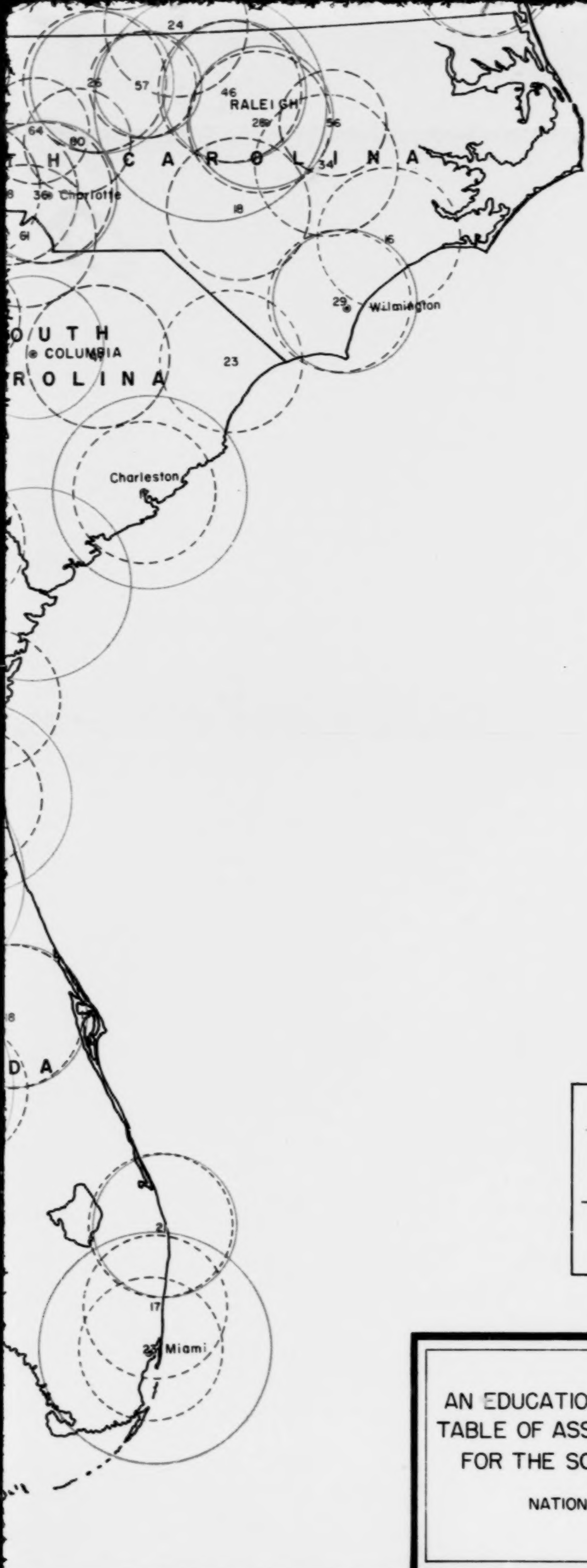
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KEY

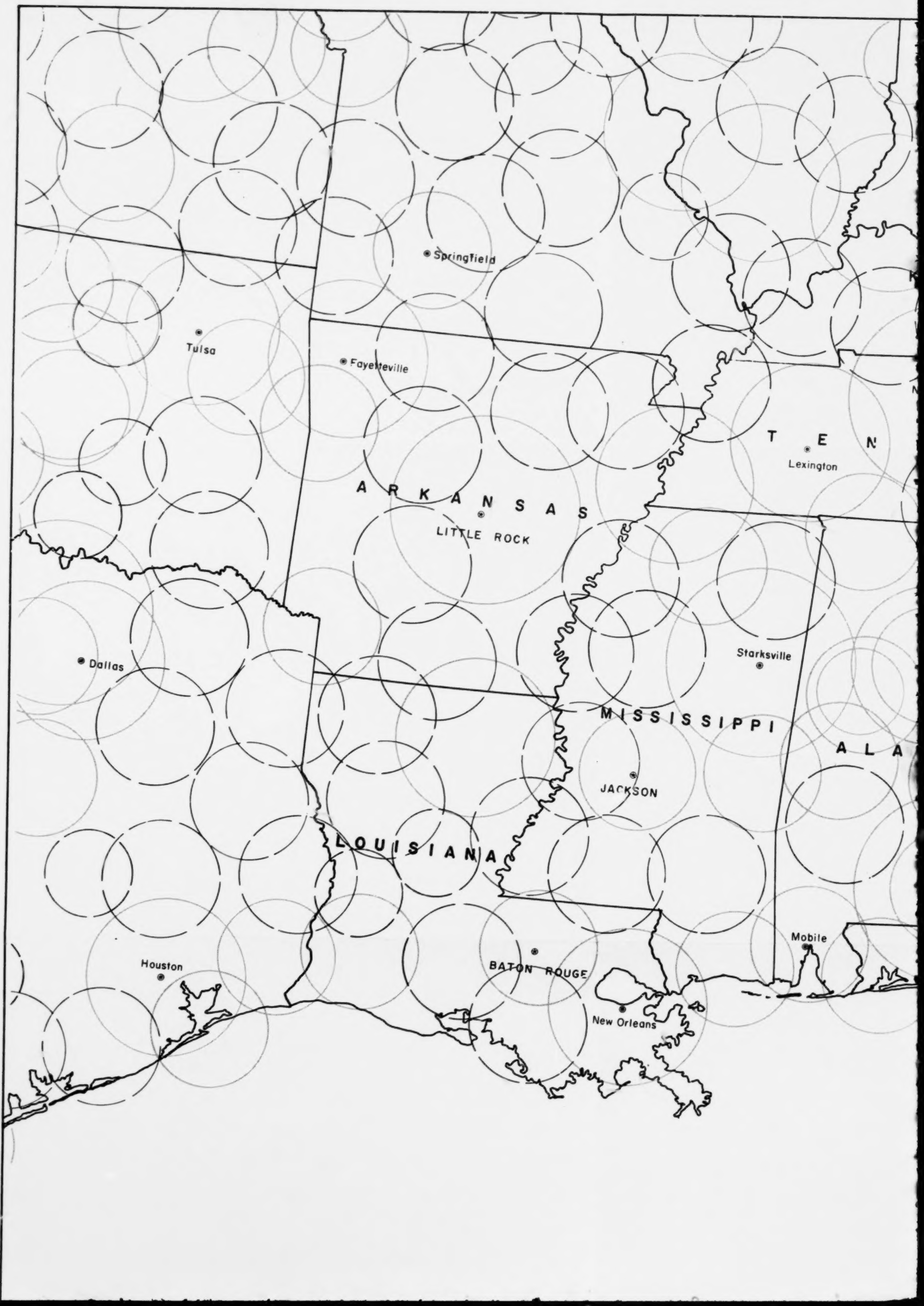
——— EXISTING EDUCATIONAL RESERVATIONS

- - - - - - ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS (NOTE: CHANNEL NO'S LOCATED AT CENTERS)

FIG. 2

AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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Mobile
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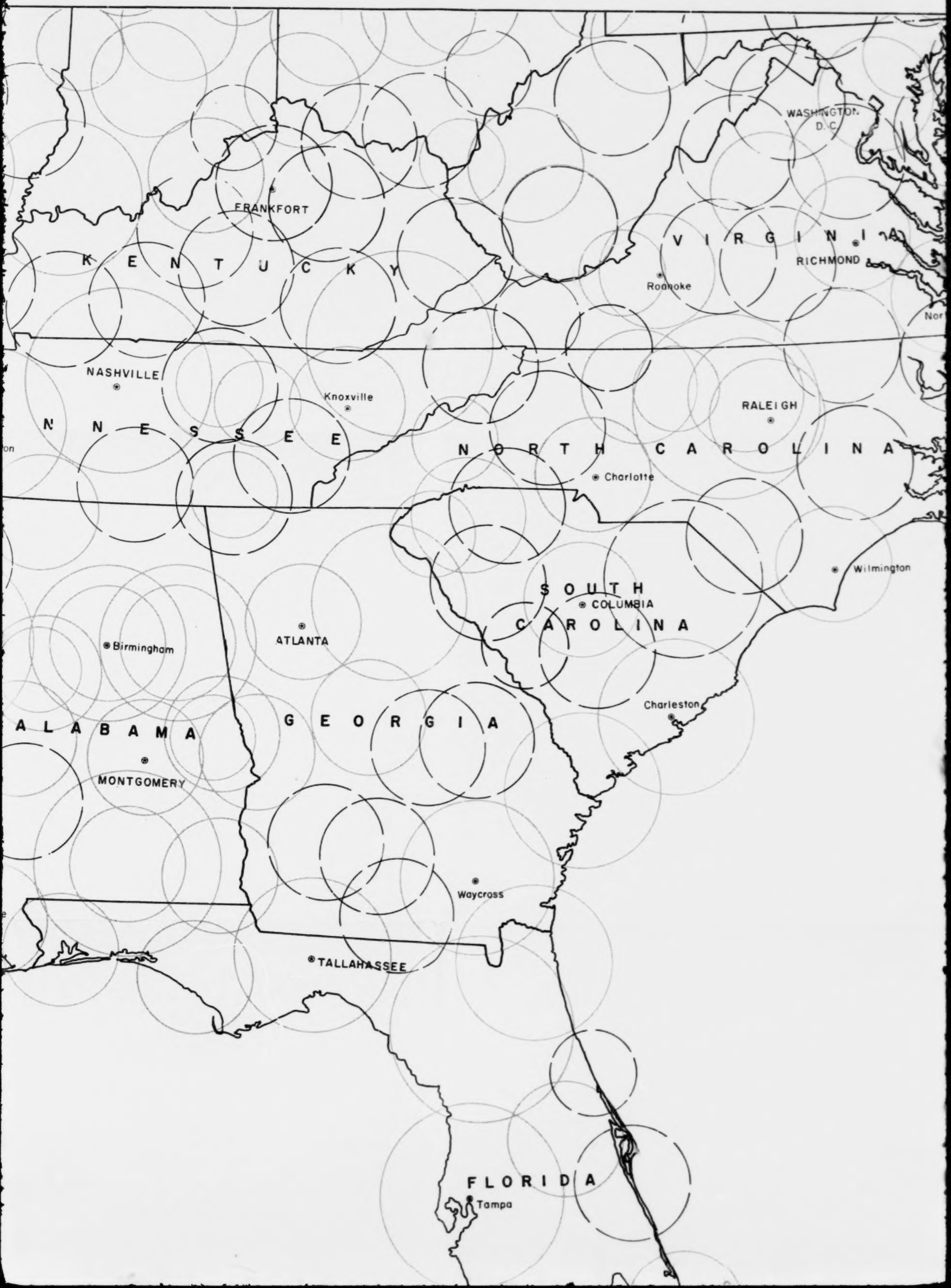
BATON ROUGE
New Orleans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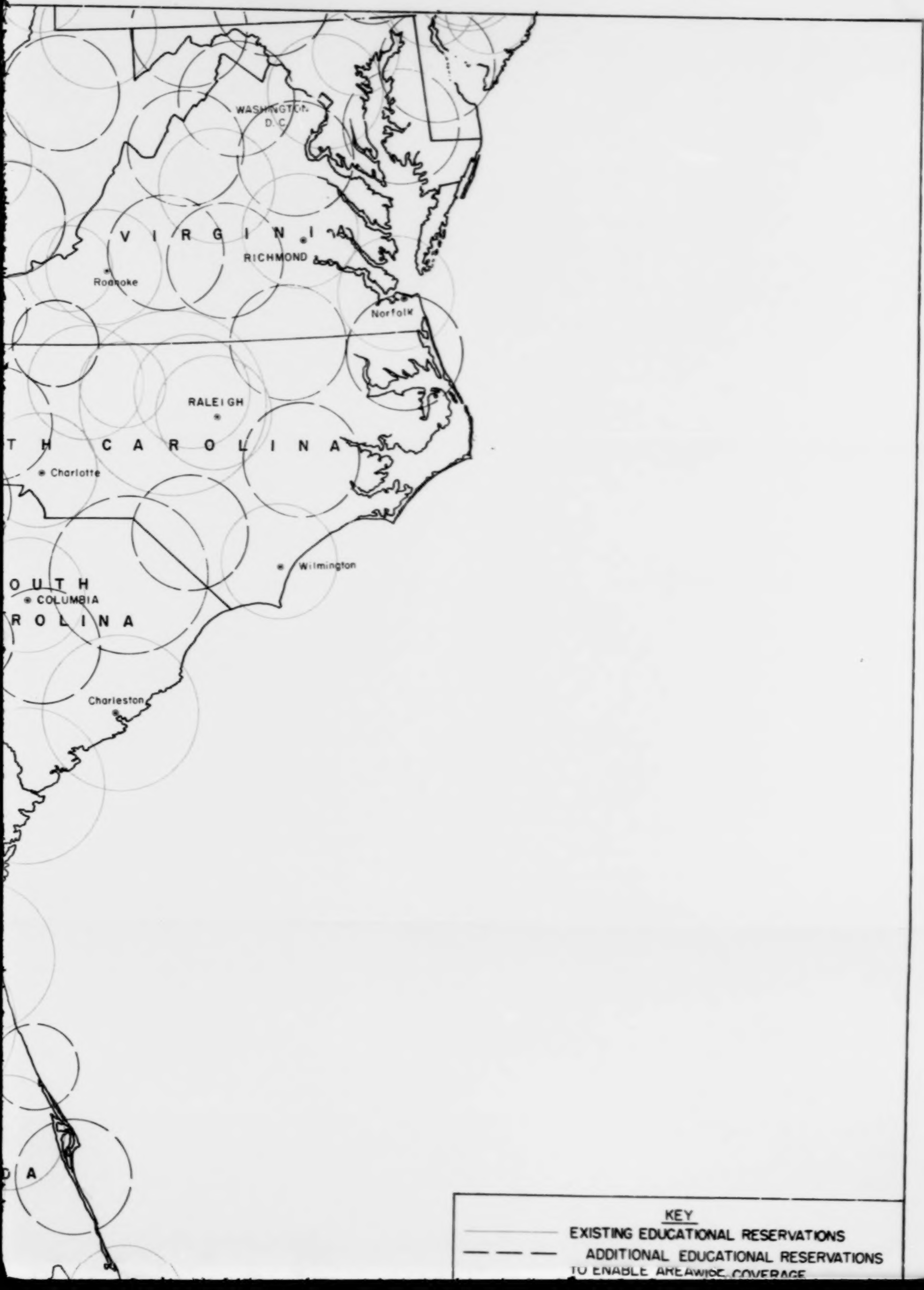
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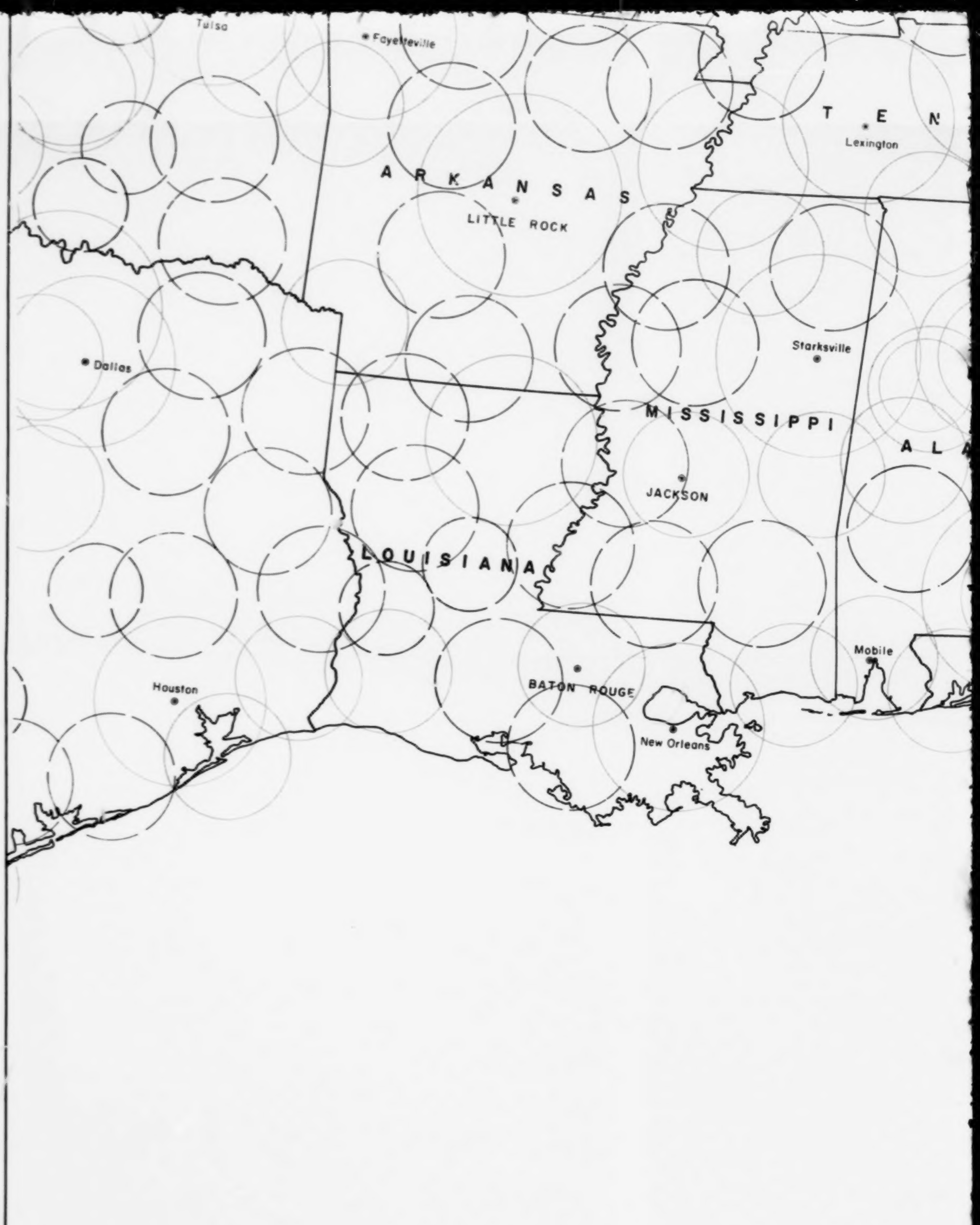
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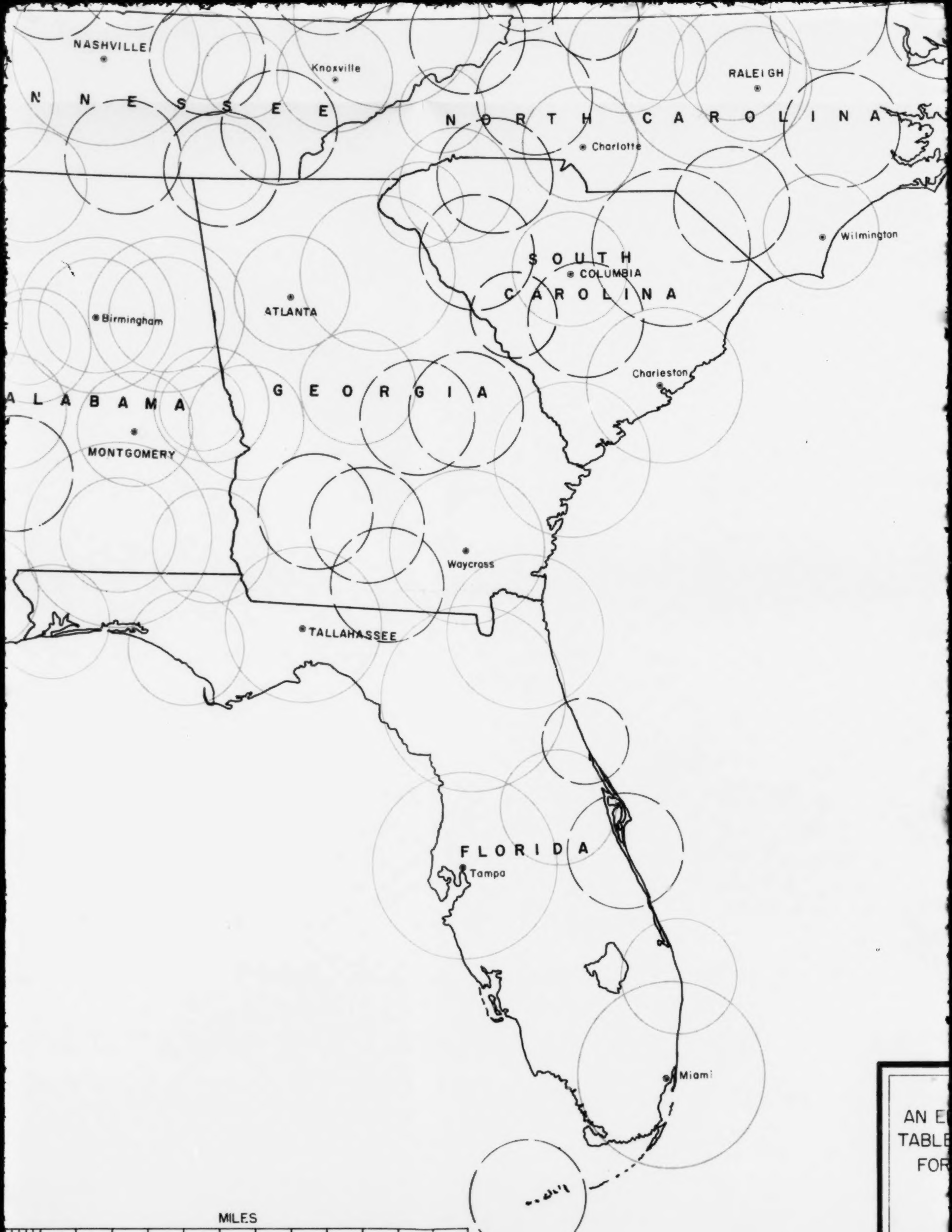
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KEY

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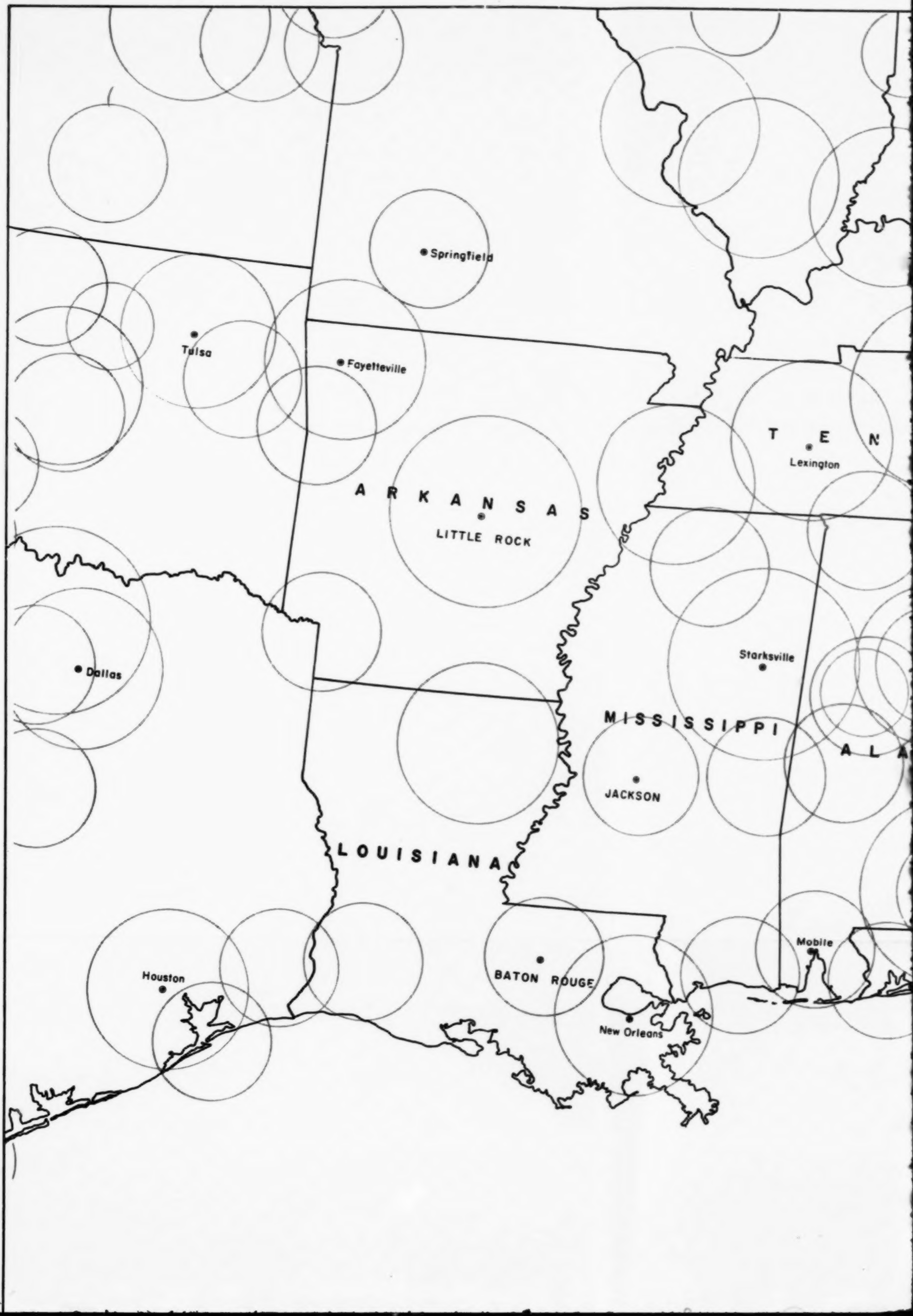
FIG. 2
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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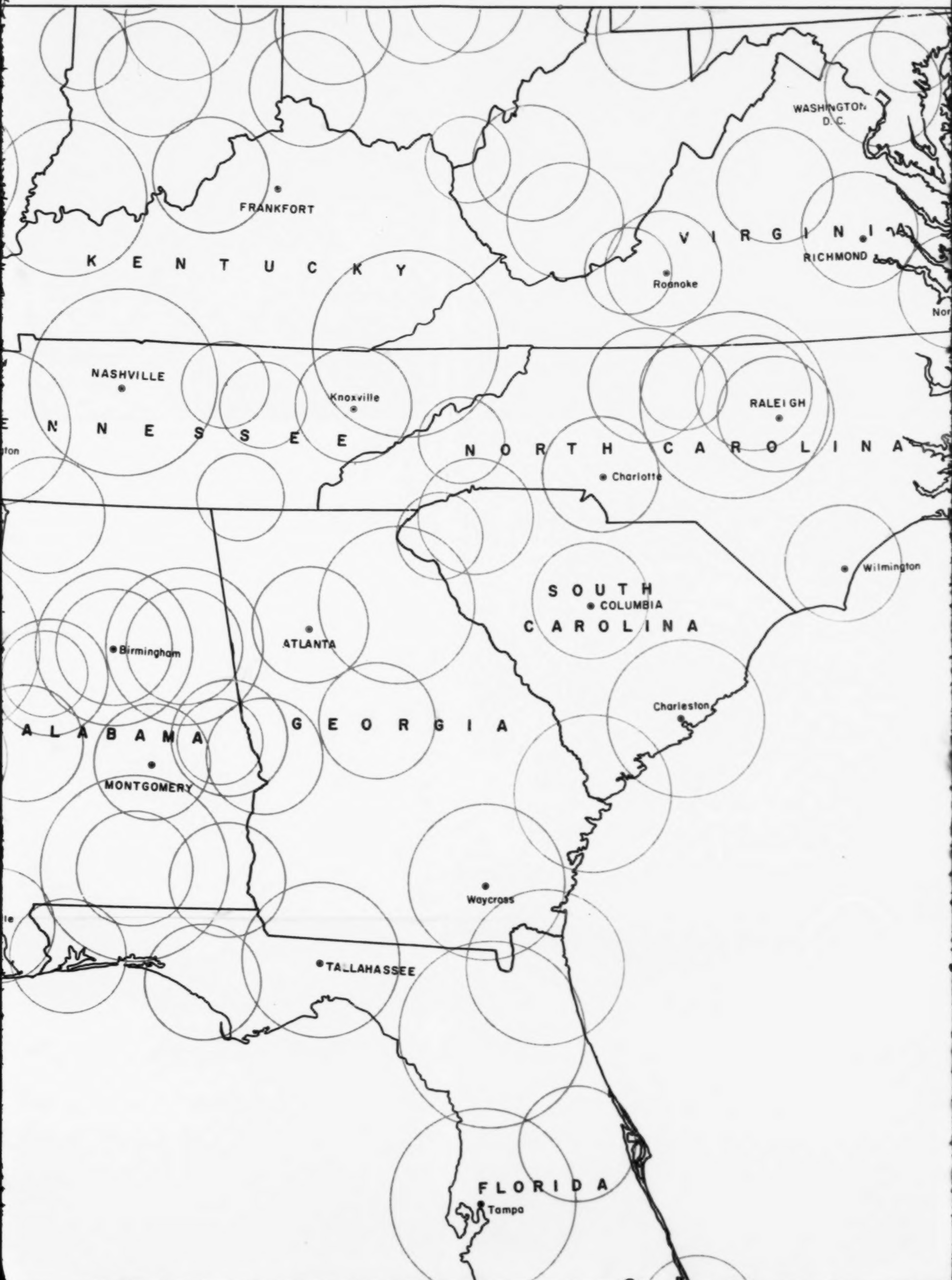
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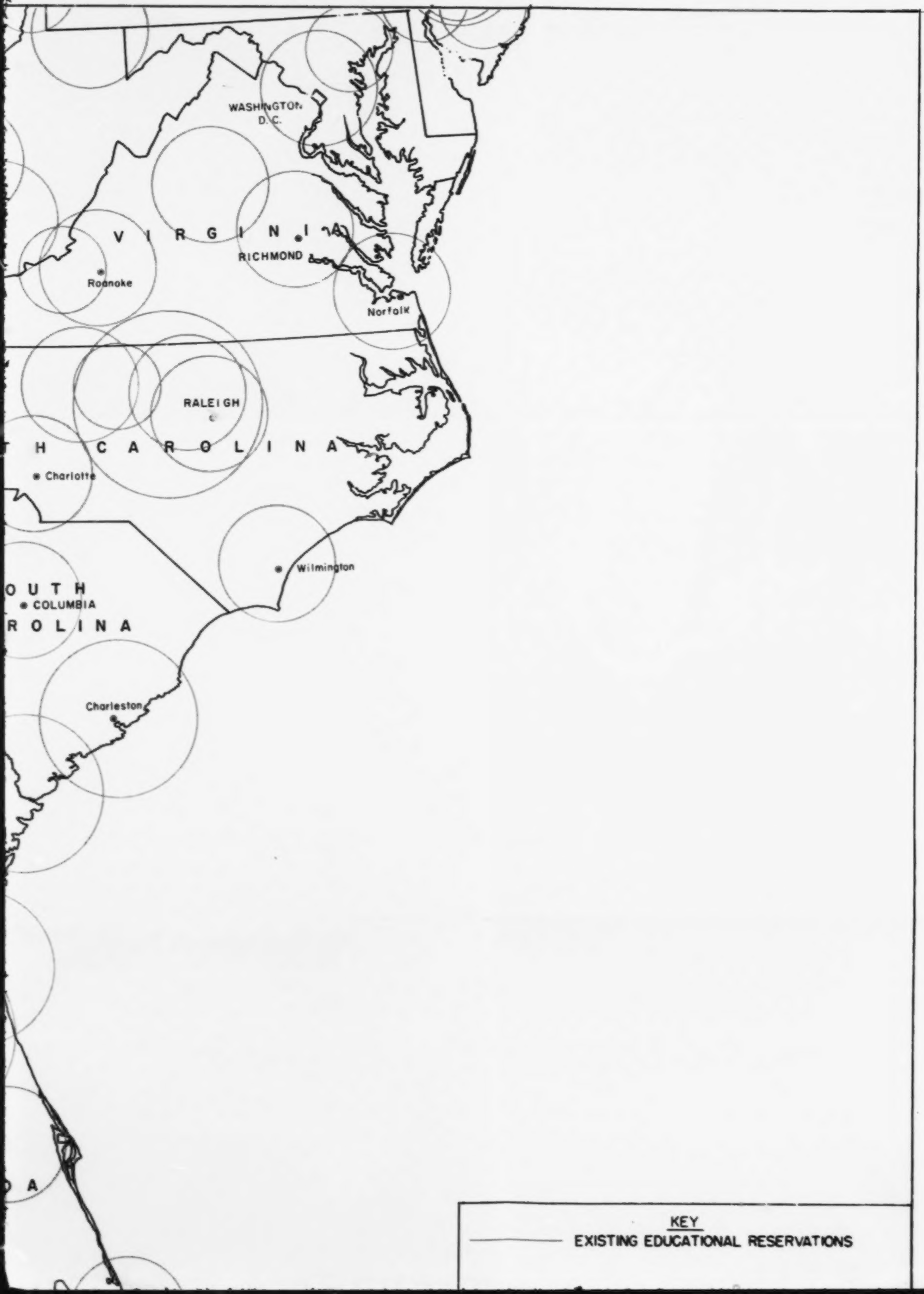
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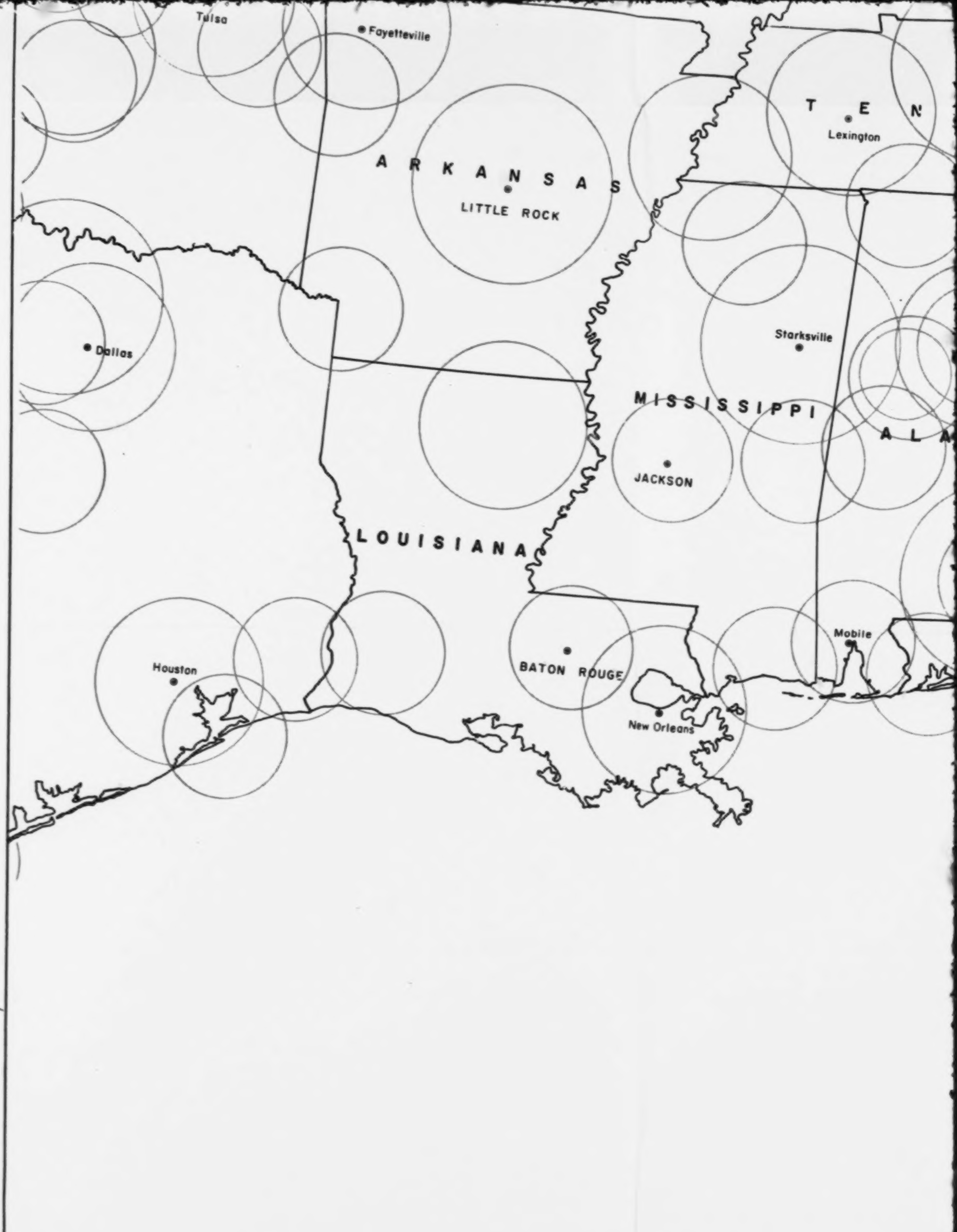
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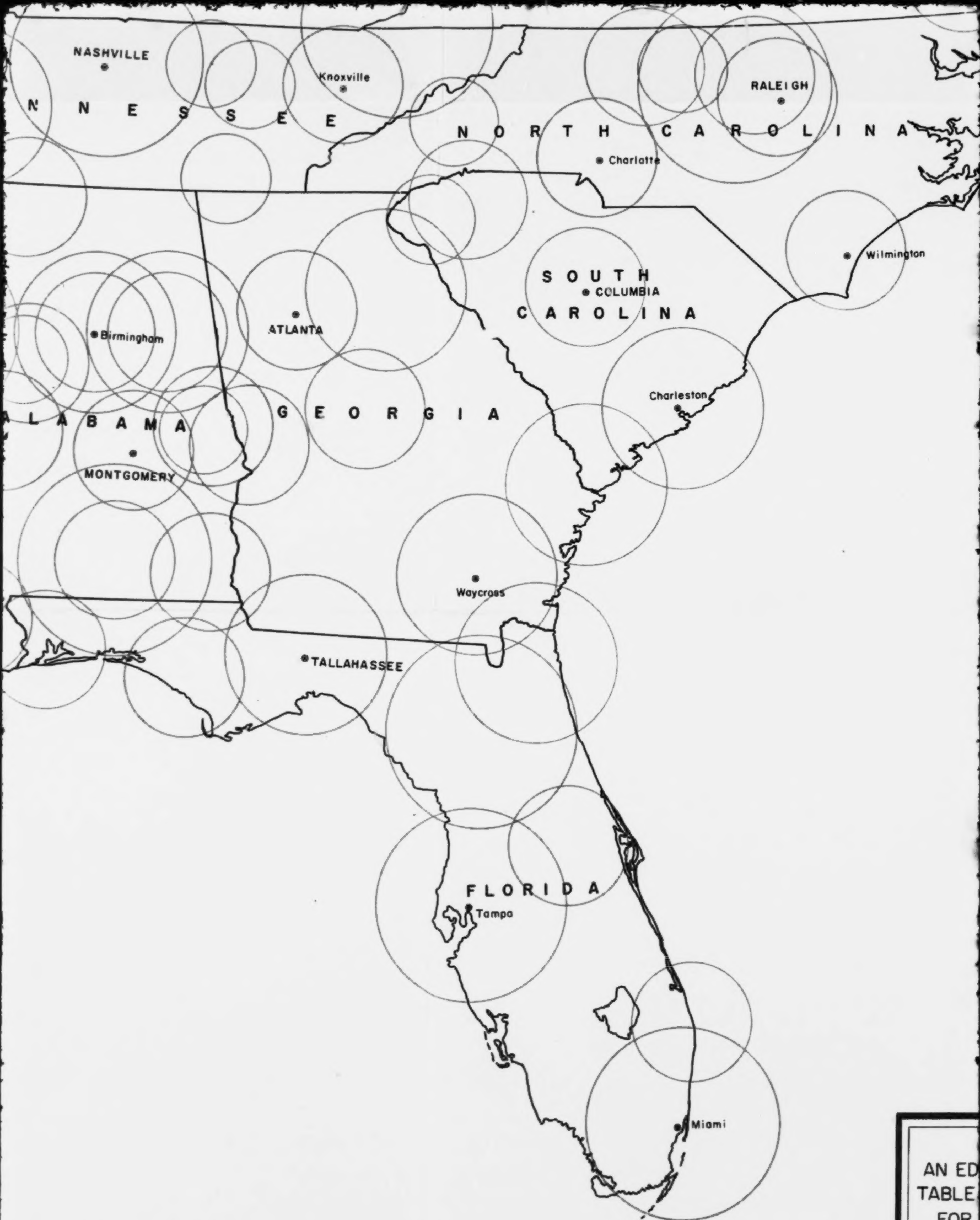
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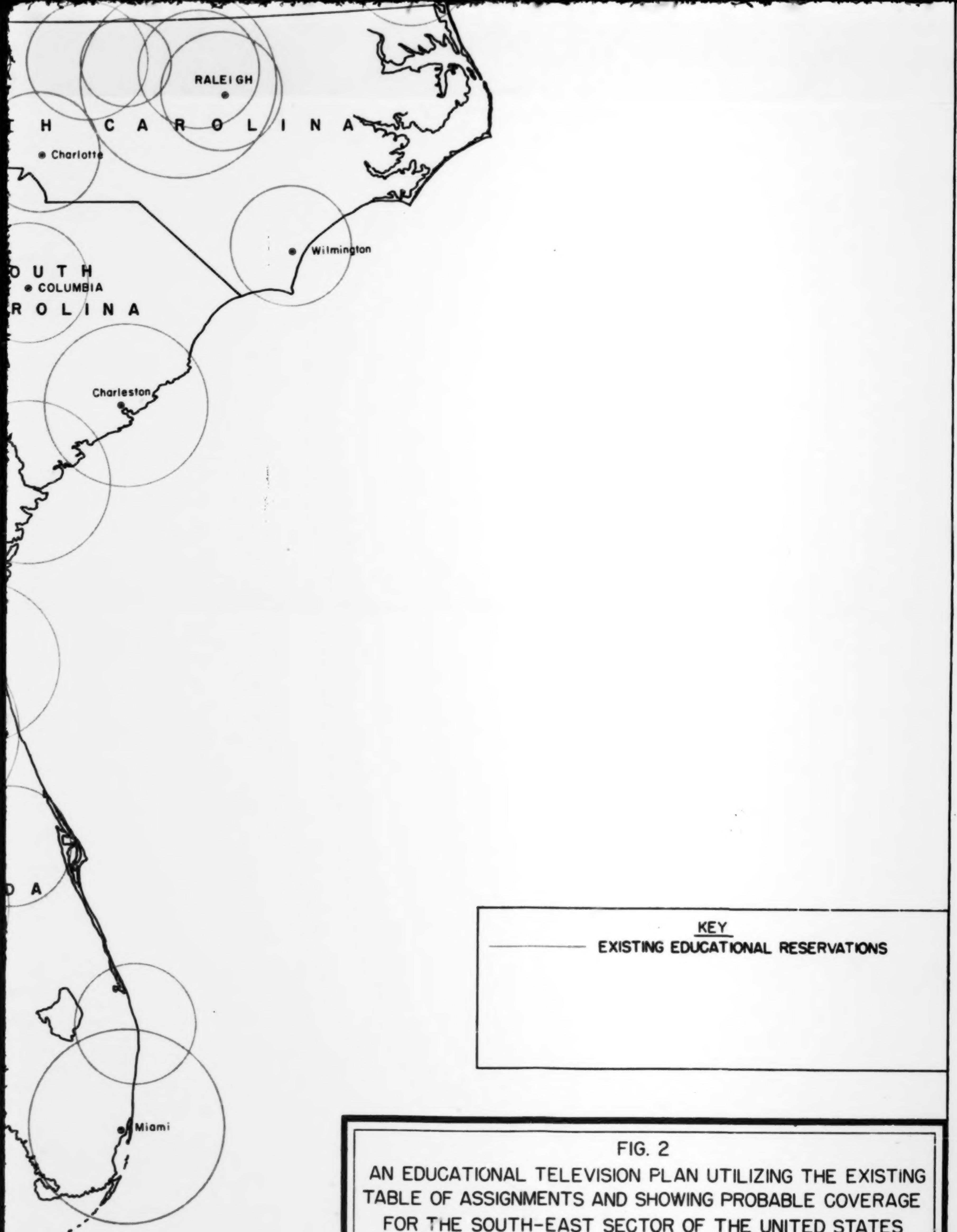
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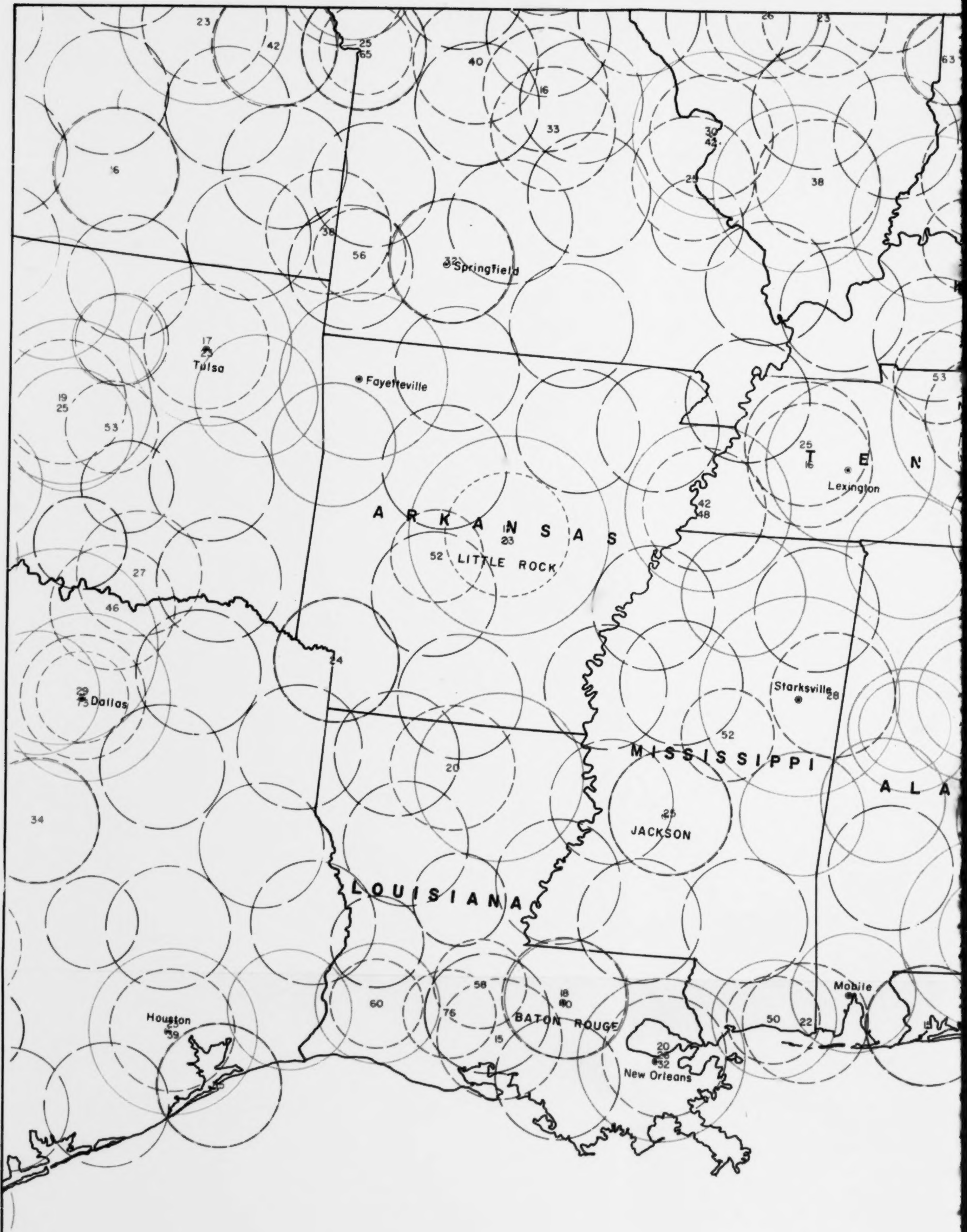
EXISTING EDUCATIONAL RESERVATIONS

FIG. 2
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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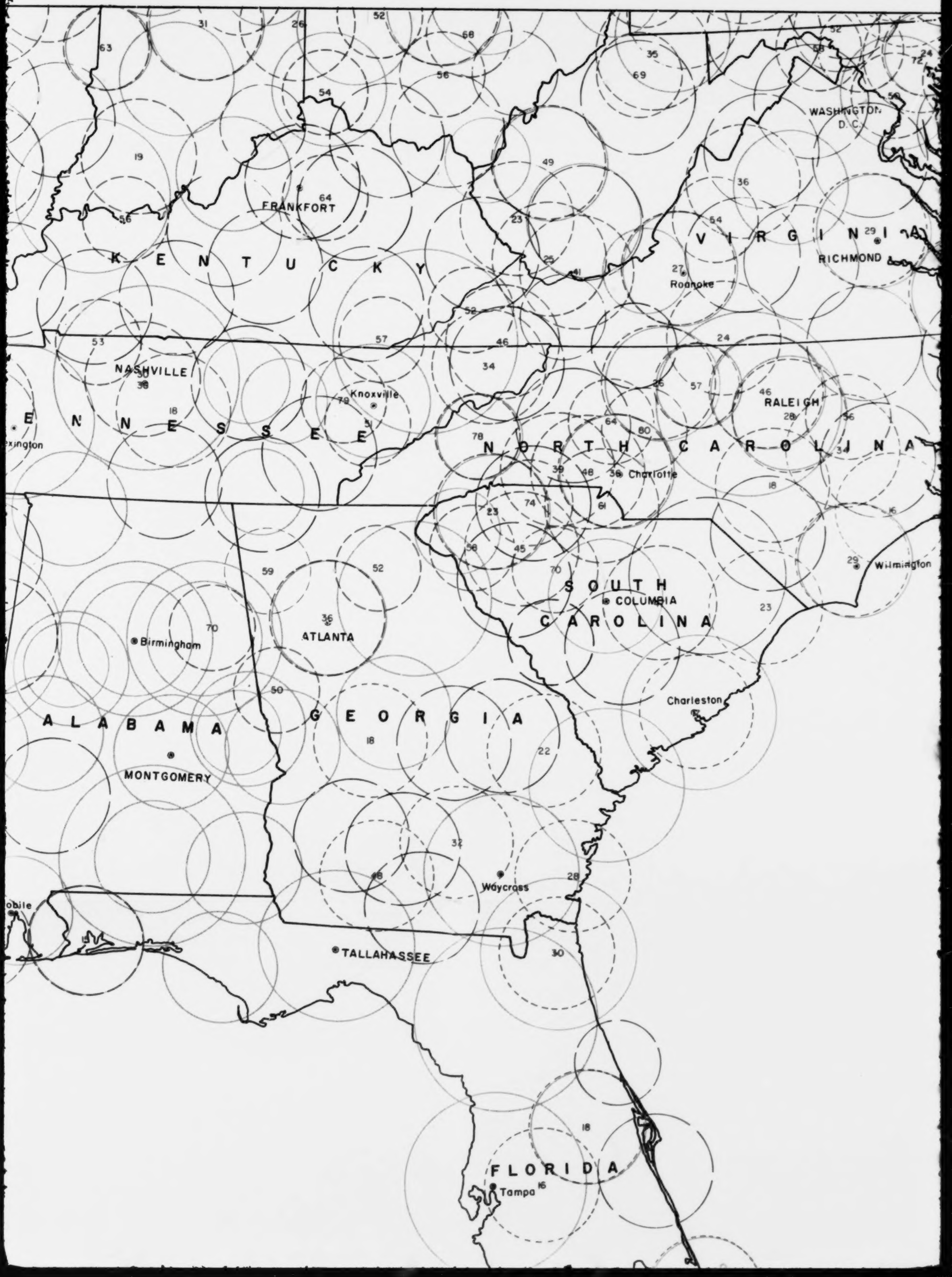
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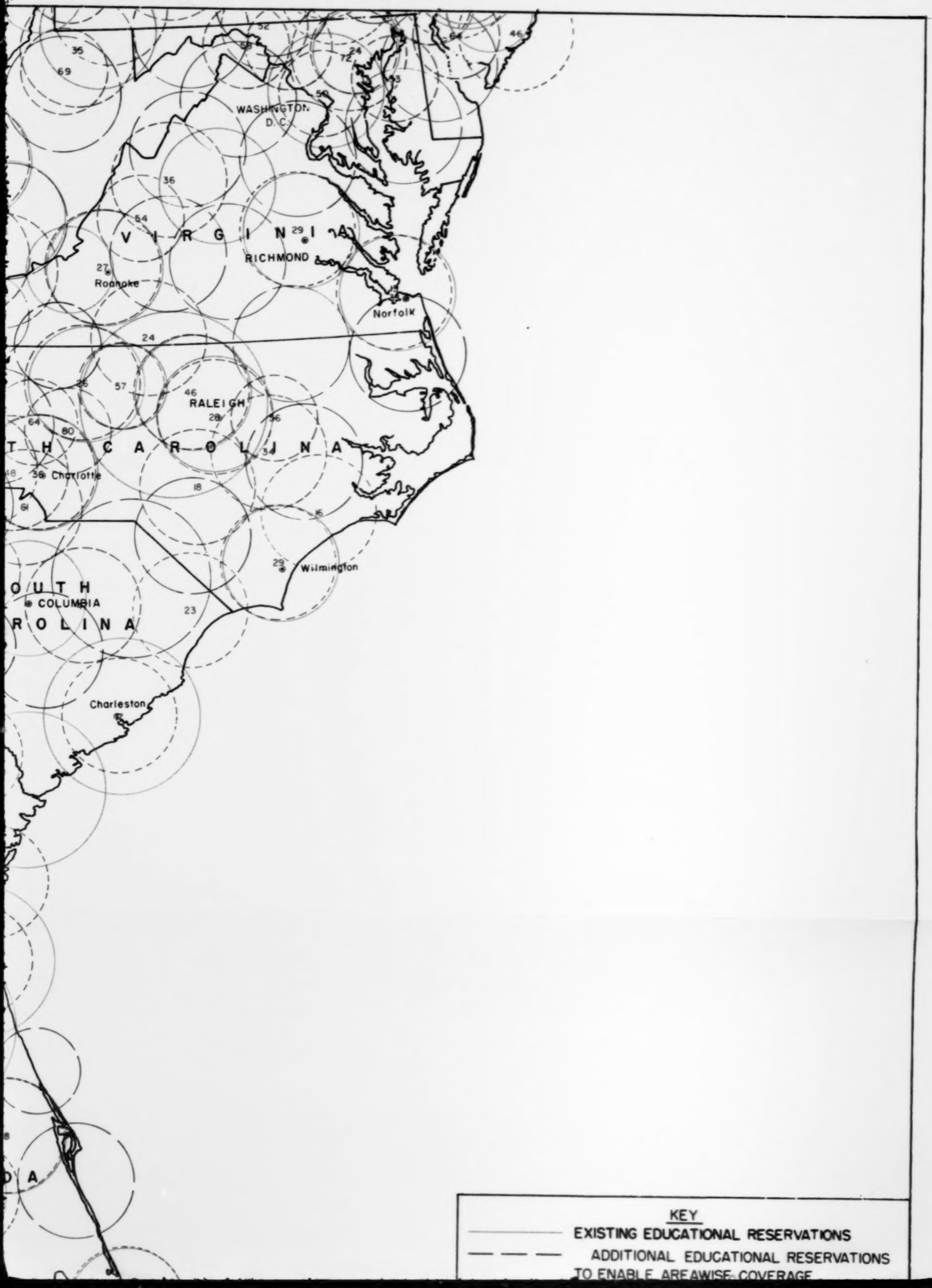
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EXISTING EDUCATIONAL RESERVATIONS
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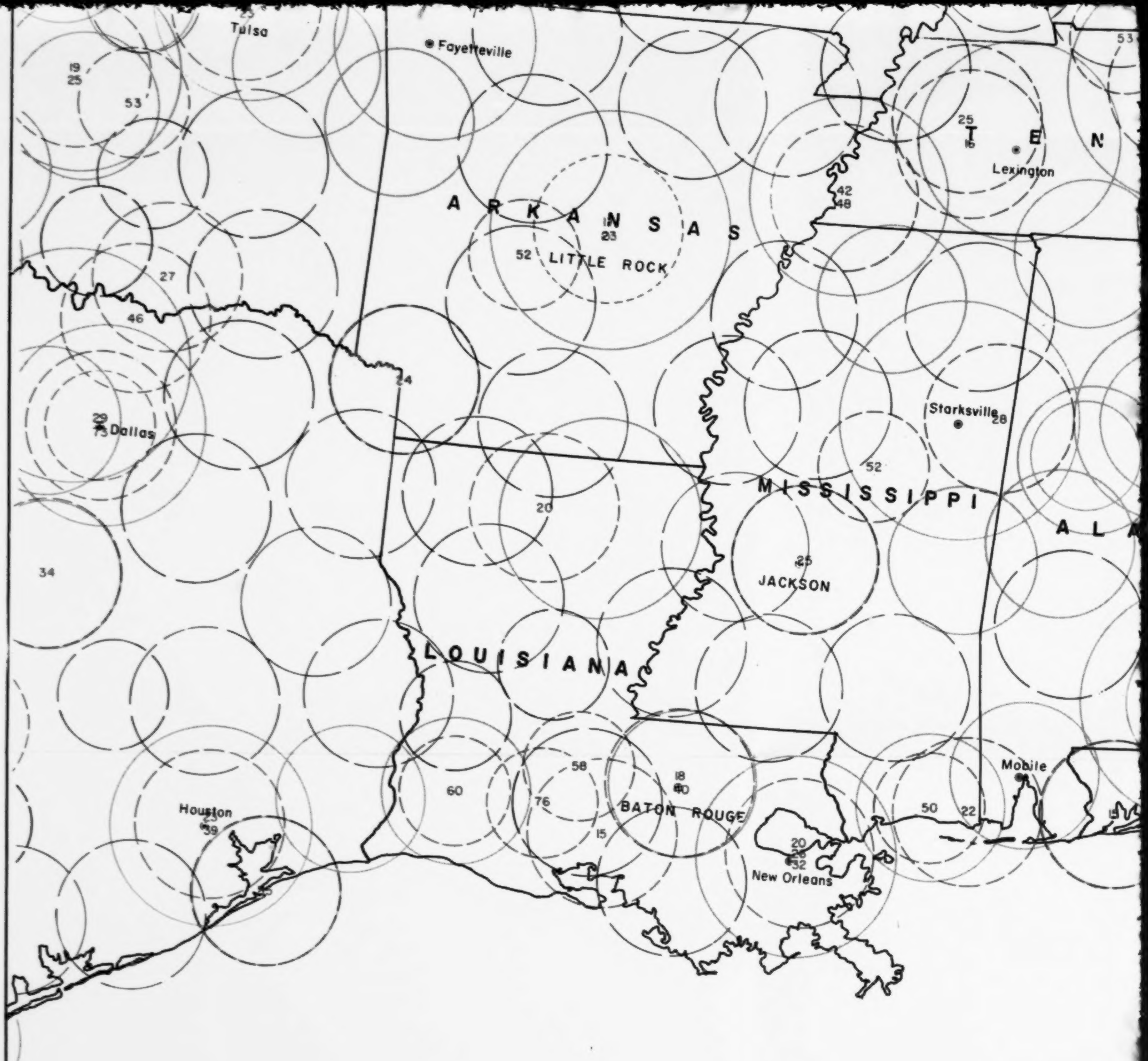
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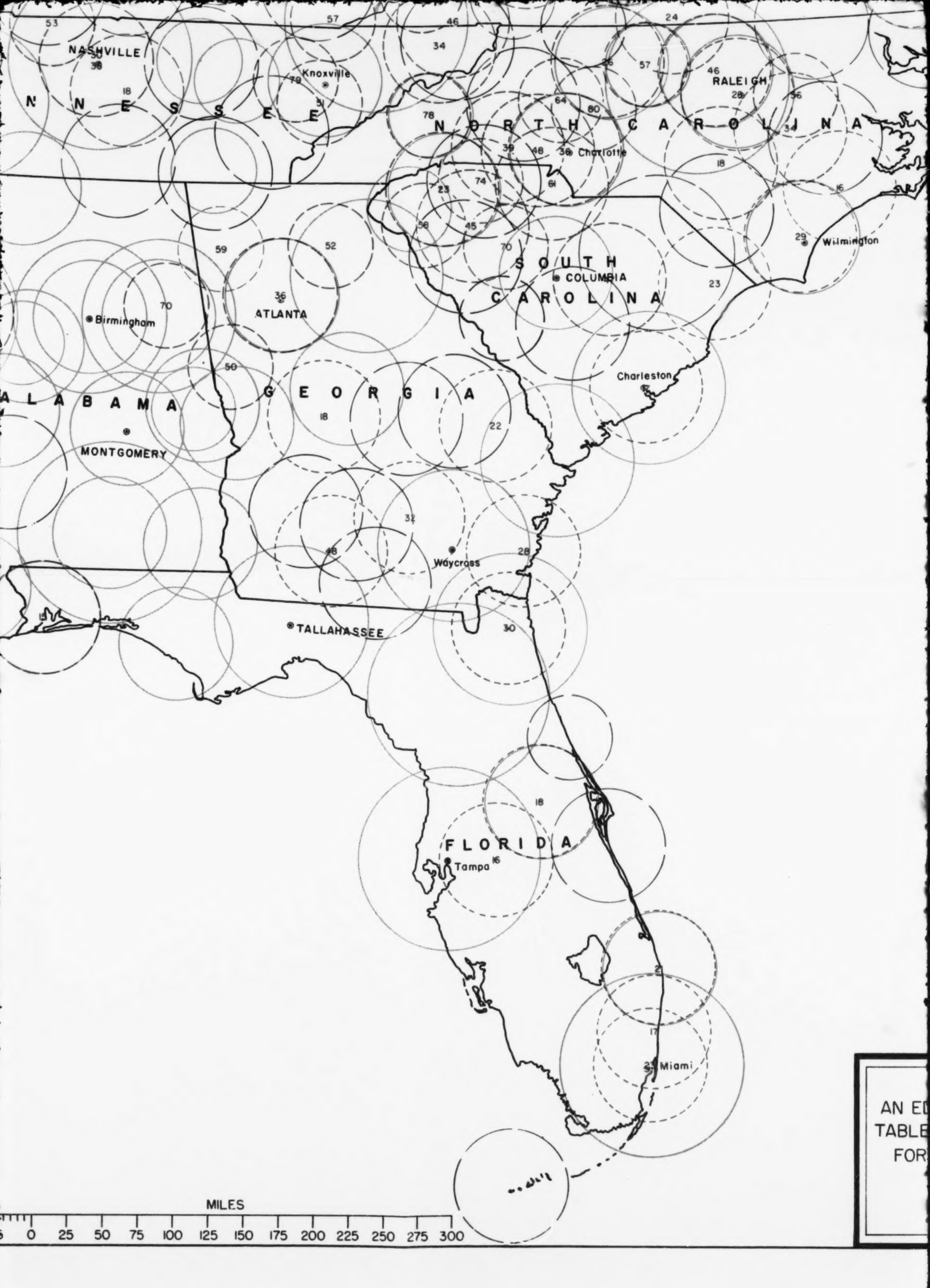
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NASHVILLE
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Knoxville
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RALEIGH
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N N E S S E E
78
64
80
N O R T H C A R O L I N A
34
39
48
36 Charlotte
18
23
74
61
16
58
45
29 Wilmington
59
52
70
S O U T H
COLUMBIA
C A R O L I N A
23
36
ATLANTA
70
Birmingham
50
Charleston
A L A B A M A
G E O R G I A
18
22
MONTGOMERY
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Waycross
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TALLAHASSEE
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F L O R I D A
Tampa
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AN ED
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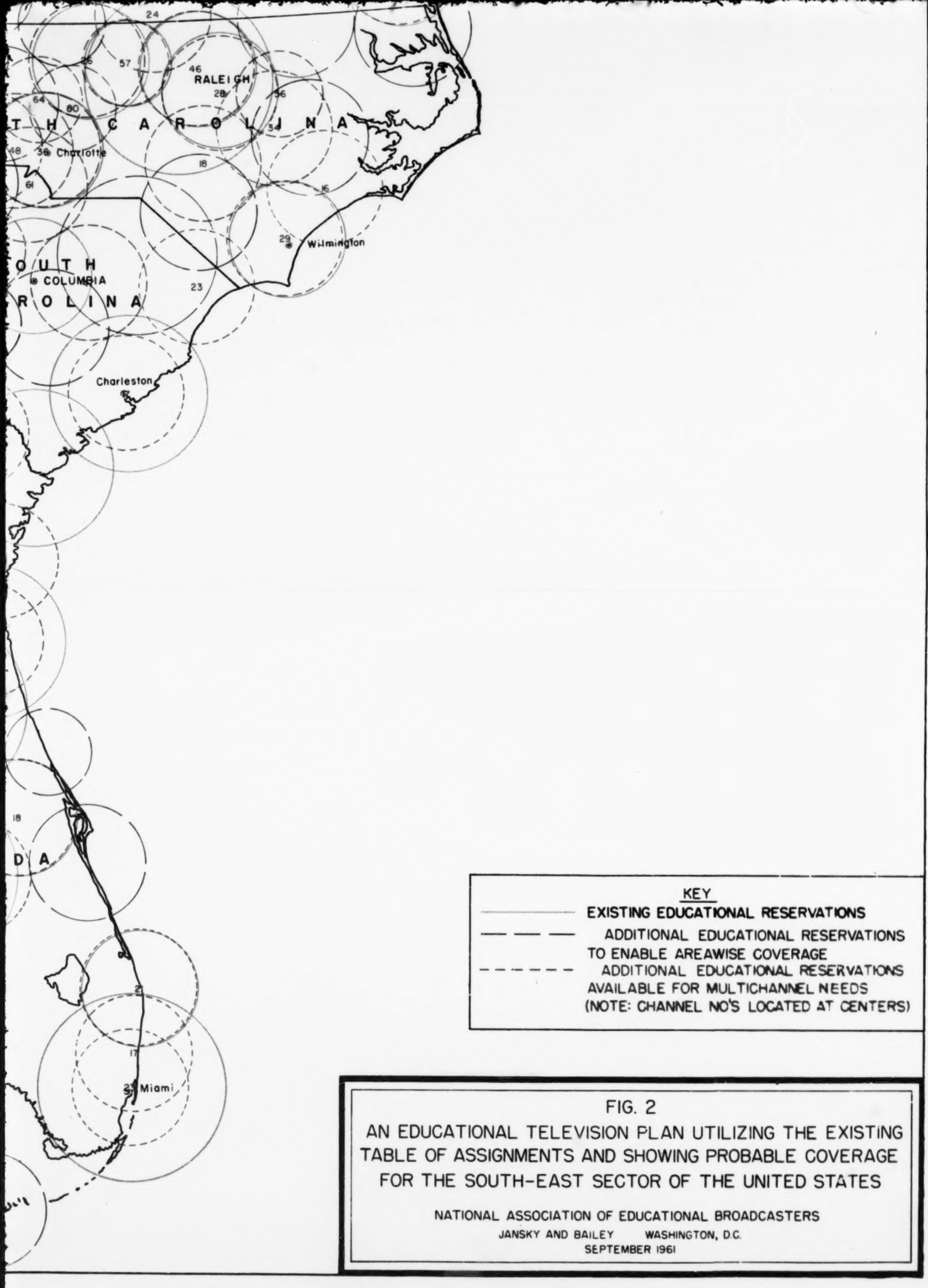
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C A R O L I N A
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38 Charlotte
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61
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29 Wilmington
O U T H
COLUMBIA
R O L I N A
23
Charleston
18
D A
21
17
21 Miami
KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS
(NOTE: CHANNEL NO'S LOCATED AT CENTERS)

FIG. 2

AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-EAST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961

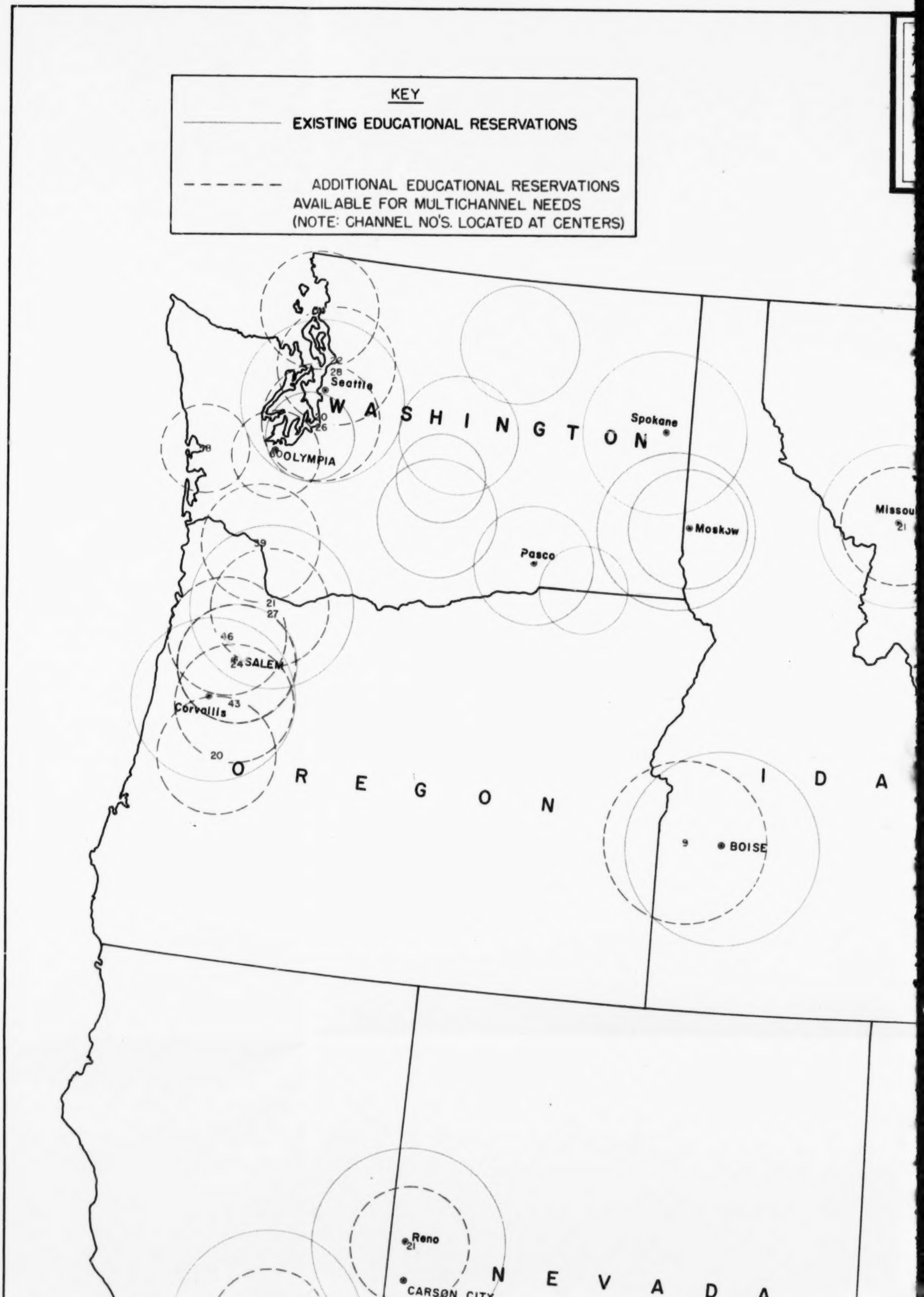
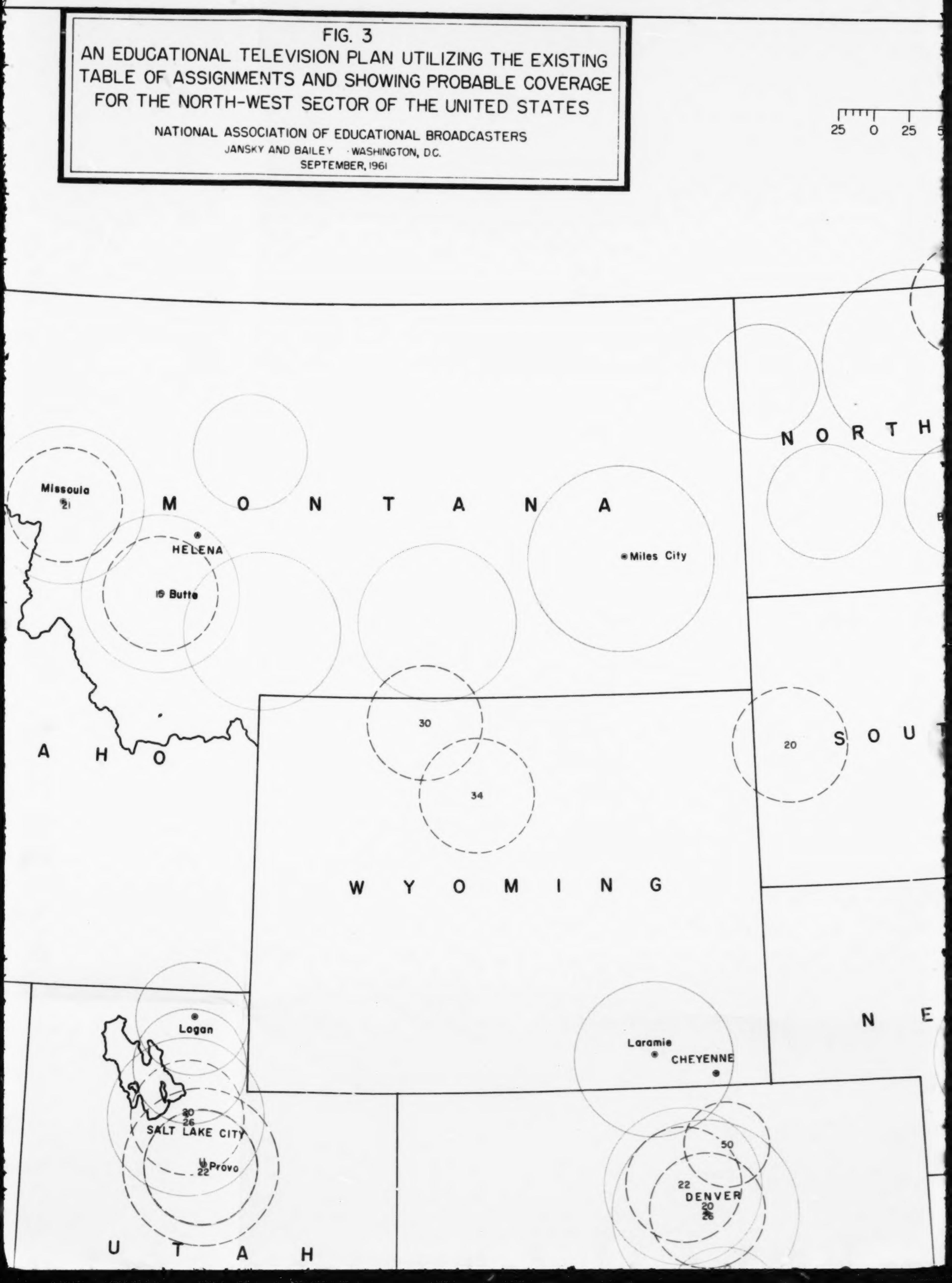

KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS (NOTE: CHANNEL NO'S. LOCATED AT CENTERS)
WASHINGTON
22
28
Seattle
20
26
OLYMPIA
78
Spokane
Pasco
Moskow
39
21
27
46
24
SALEM
Corvallis
43
20
OREGON
IDA
9
BOISE
Missou
21
Reno
21
CARSON CITY
NEVADA

FIG. 3
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY · WASHINGTON, D.C.
SEPTEMBER, 1961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M O N T A N A
Missoula
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HELENA
15 Butte
Miles City
N O R T H
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S O U
W Y O M I N G
N E
Logan
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SALT LAKE CITY
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22 Provo
U T A H
Laramie
CHEYENNE
50
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DENVER
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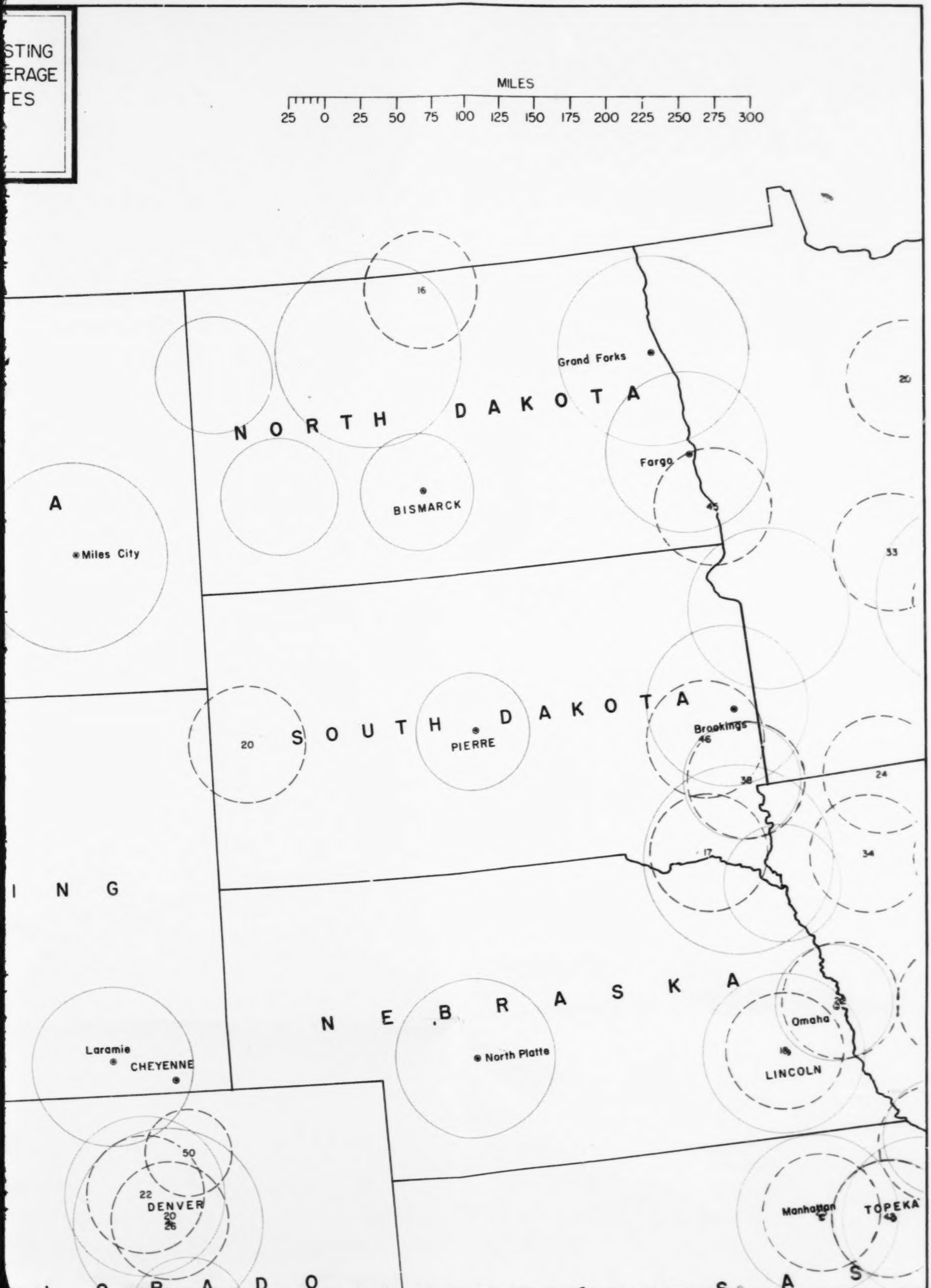
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MILES
25 0 25 50 75 100 125 150 175 200 225 250 275 300
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Grand Forks
NORTH DAKOTA
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Fargo
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Miles City
33
SOUTH DAKOTA
Brookings
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PIERRE
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ING
NEBRASKA
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Laramie
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North Platte
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LORADO
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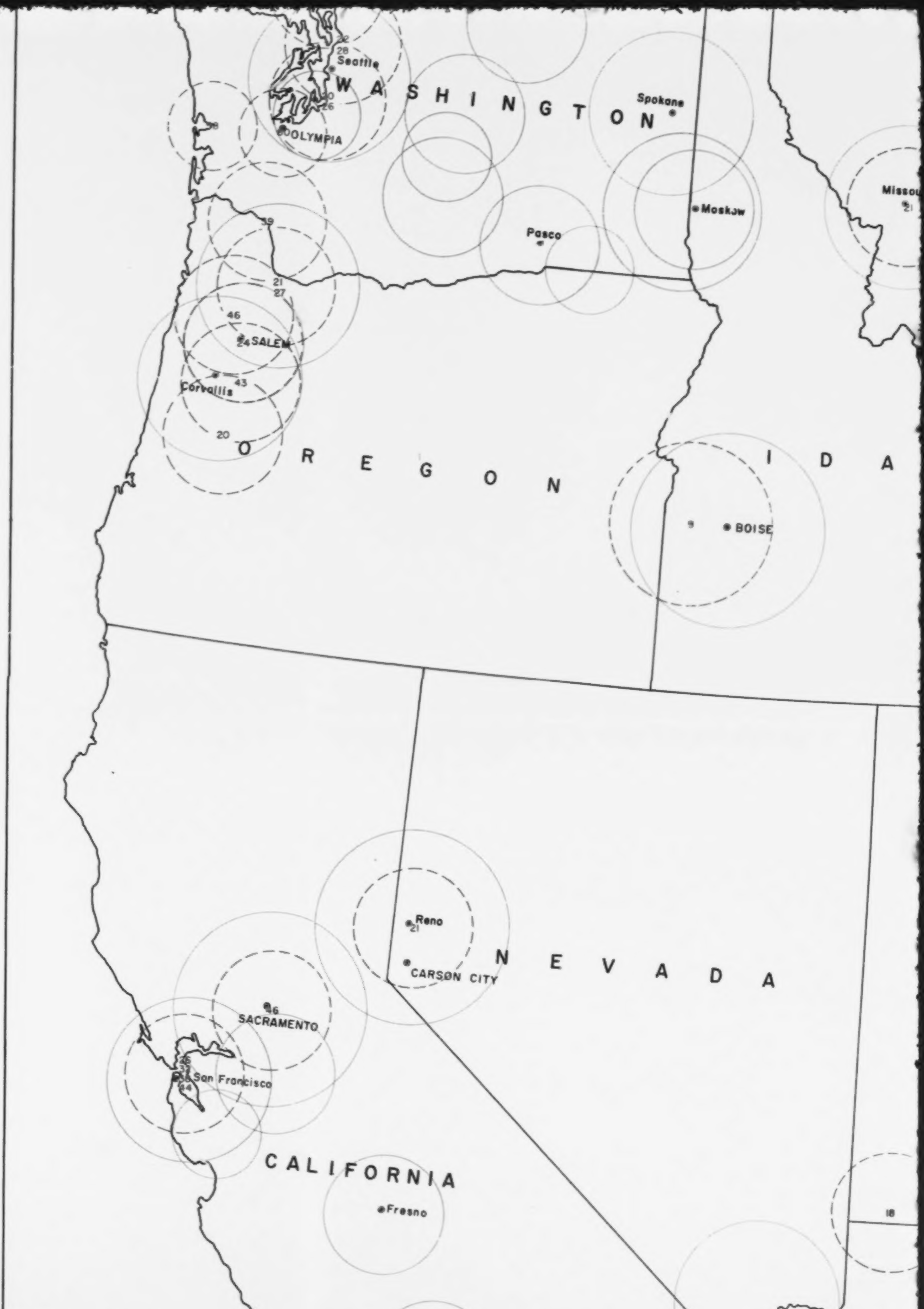
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Spokane
Moskow
Pasco
Missou
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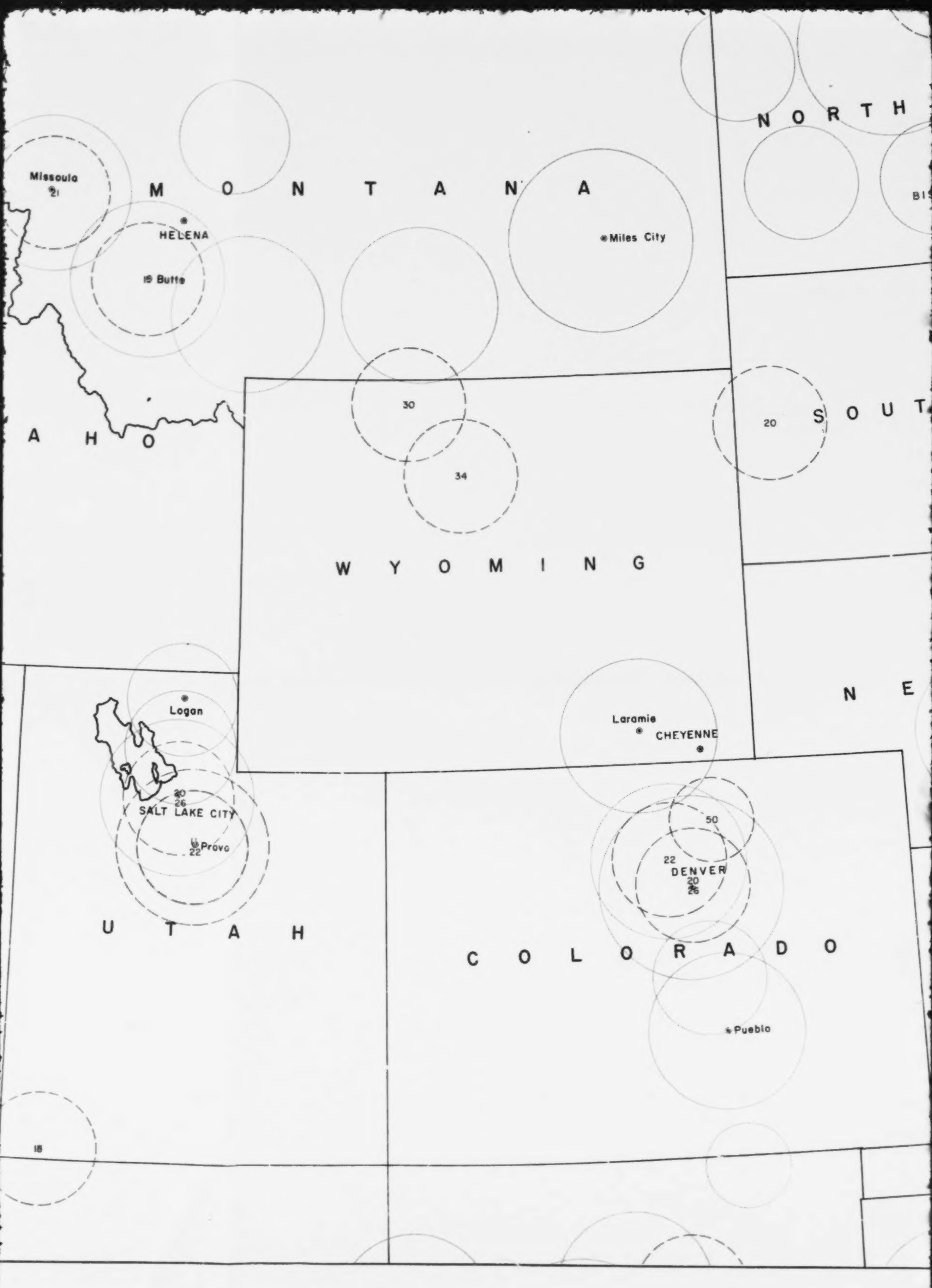
SALEM
24
Corvallis
43
20
OREGON
IDA
9
BOISE
Reno
21
CARSON CITY
NEVADA
SACRAMENTO
6
26
32
44
San Francisco
CALIFORNIA
Fresno
18

641712 O - 62 (In Pocket)


Missoula
21
MONTANA
HELENA
19 Butte
Miles City
NORTH
BIS
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SOUT
WYOMING
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Logan
Laramie
CHEYENNE
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SALT LAKE CITY
Provo
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DENVER
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UTAH
COLORADO
Pueblo
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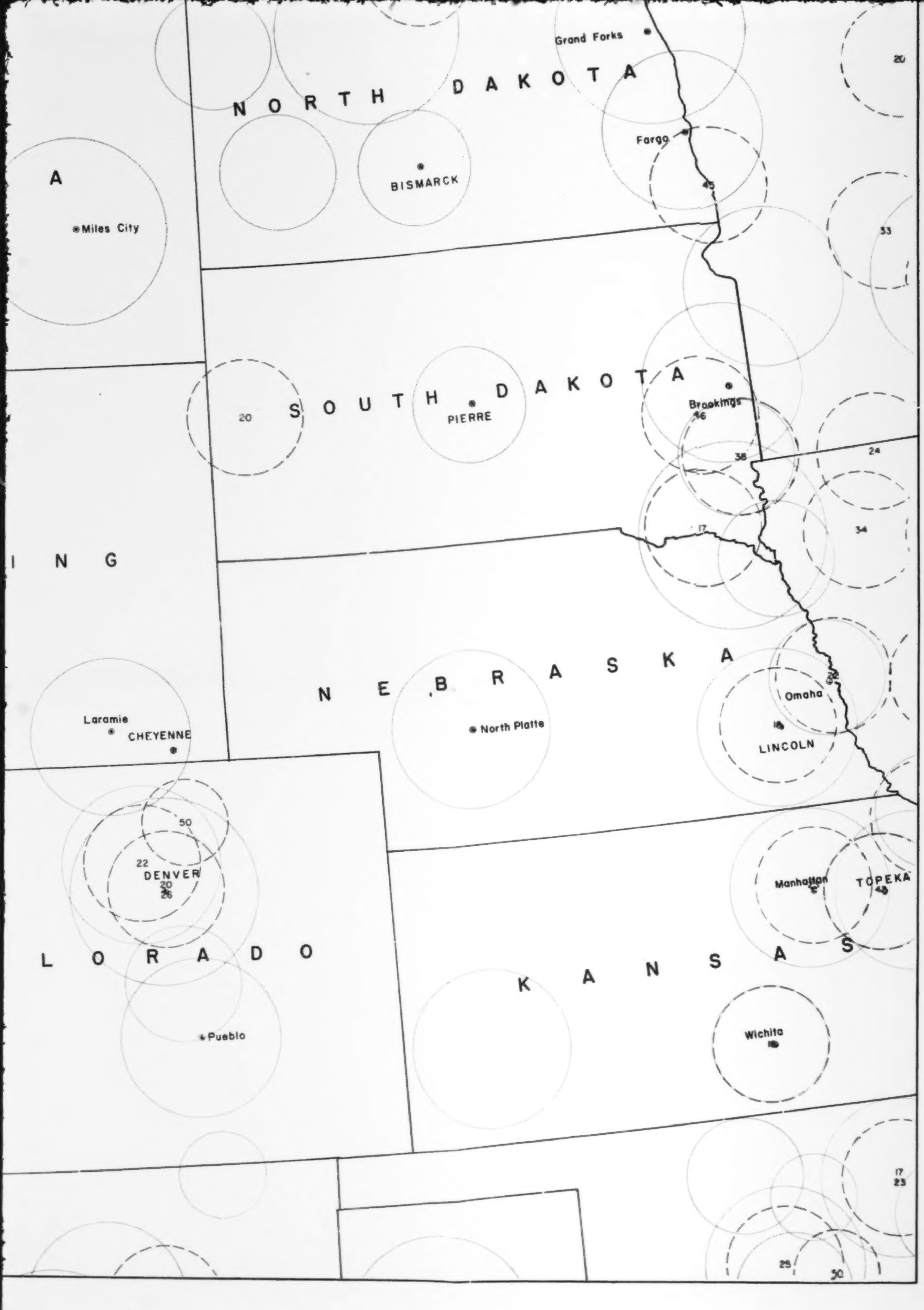
NORTH DAKOTA
Grand Forks
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North Platte
Laramie
CHEYENNE
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DENVER
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LORADO
KANSAS
Manhattan
TOPEKA
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Wichita
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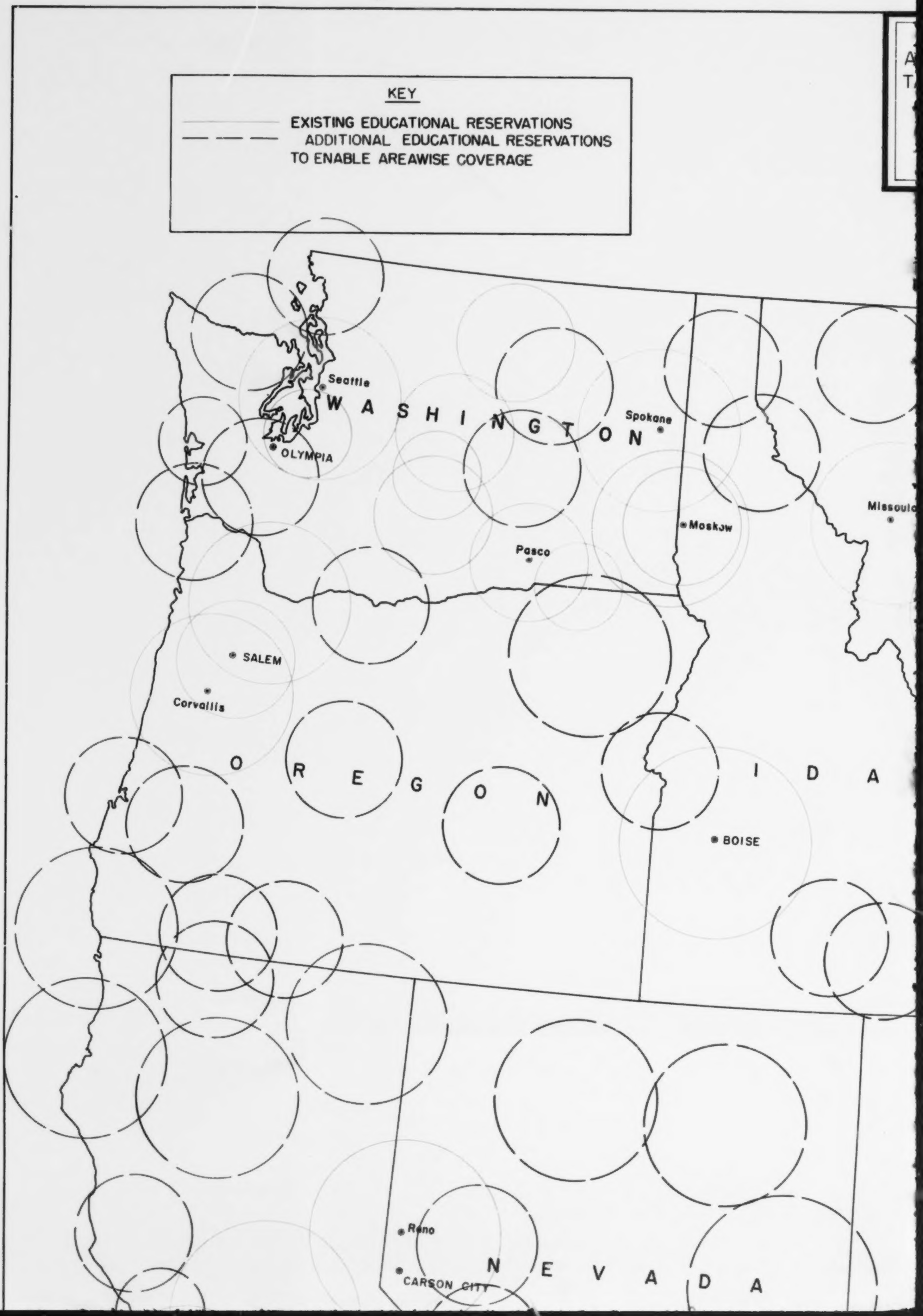
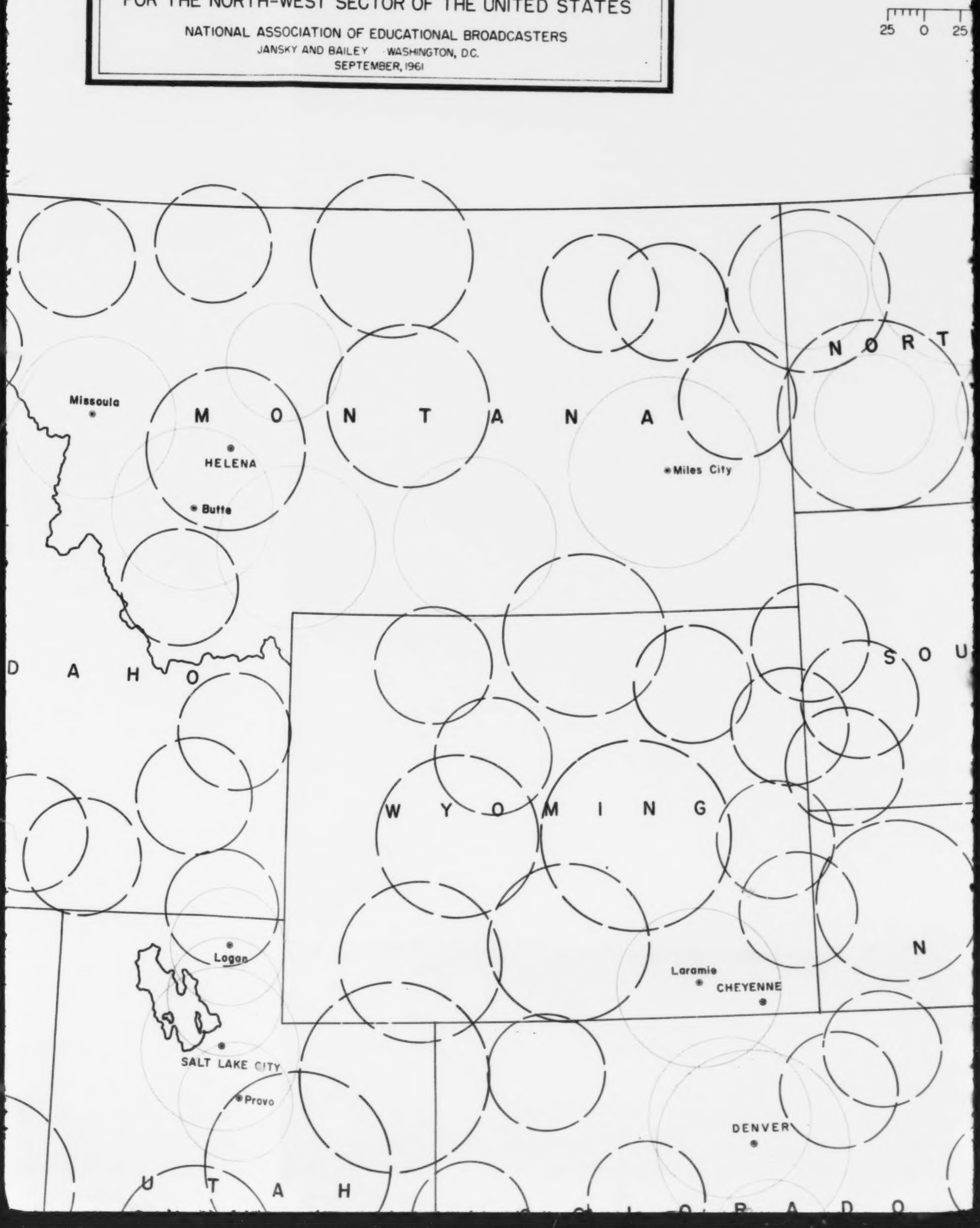

KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
Seattle
WASHINGTON
OLYMPIA
Spokane
Moskow
Pasco
Missoula
SALEM
Corvallis
OREGON
IDA
BOISE
Reno
CARSON CITY
NEVADA

2

FIG. 3

AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY · WASHINGTON, D.C.
SEPTEMBER, 1961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Miles City
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SALT LAKE CITY
Provo
DENVER
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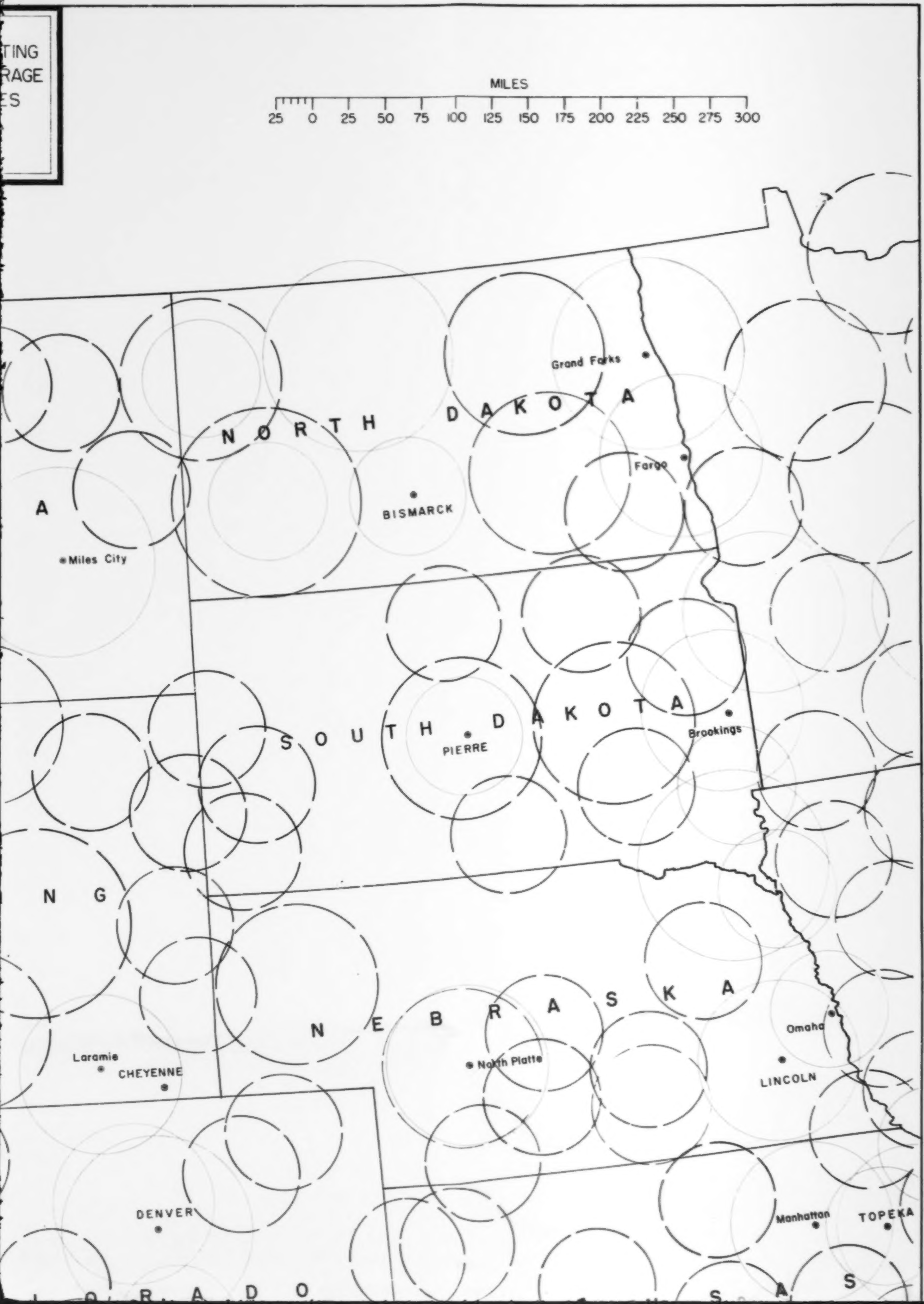
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PIERRE
Brookings
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LINCOLN
DENVER
Manhattan
TOPEKA
LORADO
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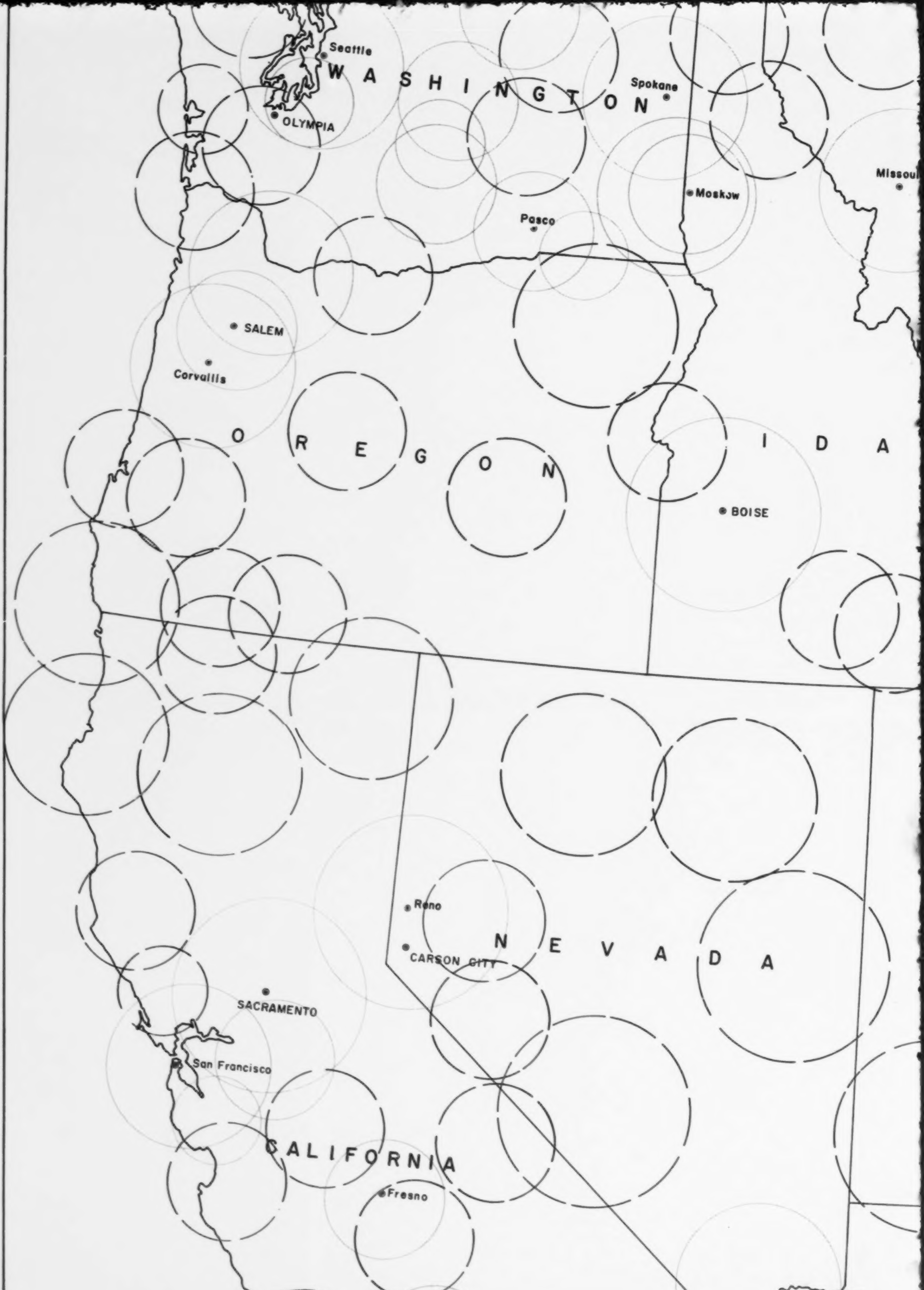
WASHINGTON
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OLYMPIA
Spokane
Moskow
Pasco
Missoul
SALEM
Corvallis
OREGON
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NEVADA
SACRAMENTO
San Francisco
CALIFORNIA
Fresno

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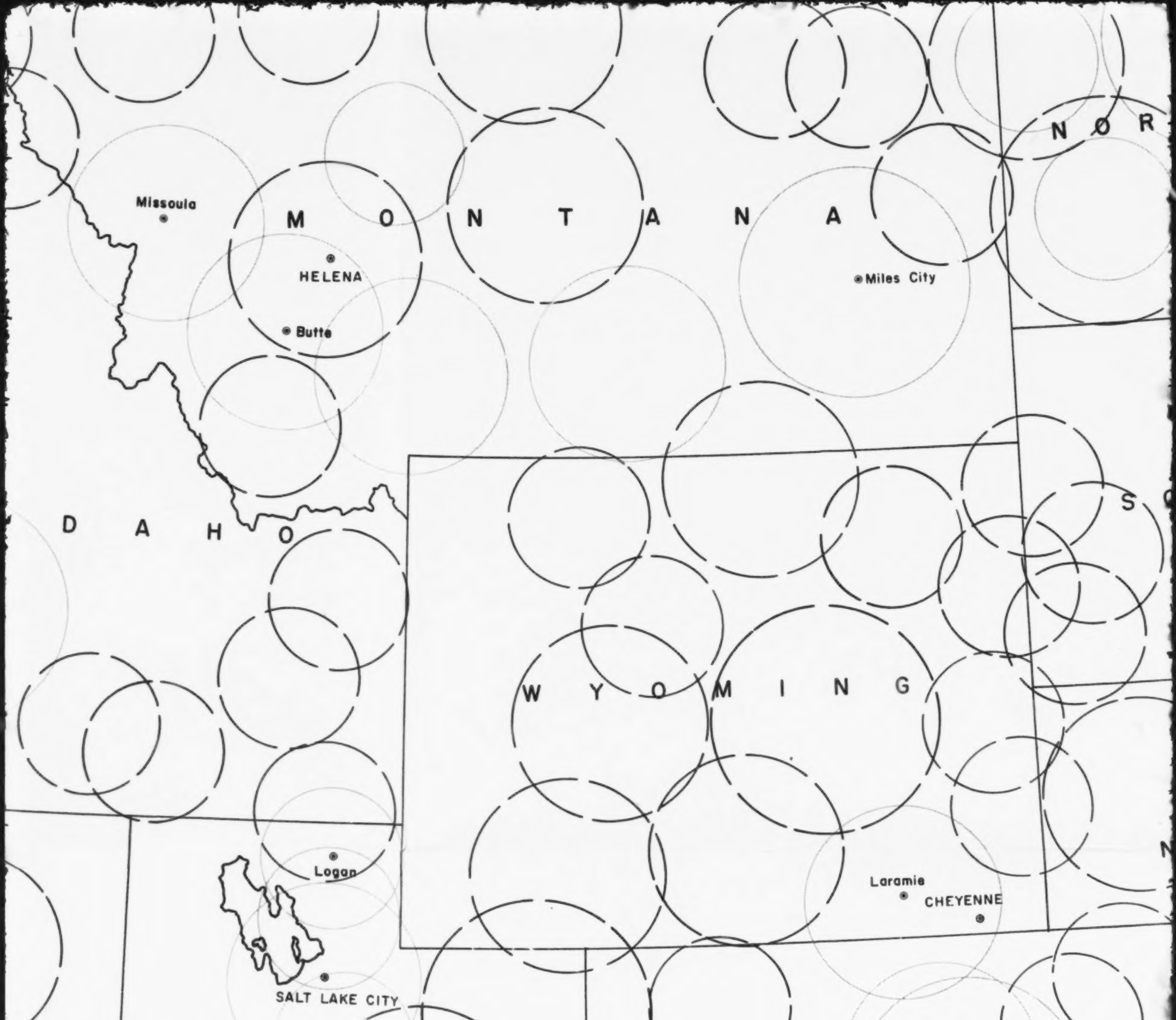
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SALT LAKE CITY
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C O L O R A D O
Pueblo

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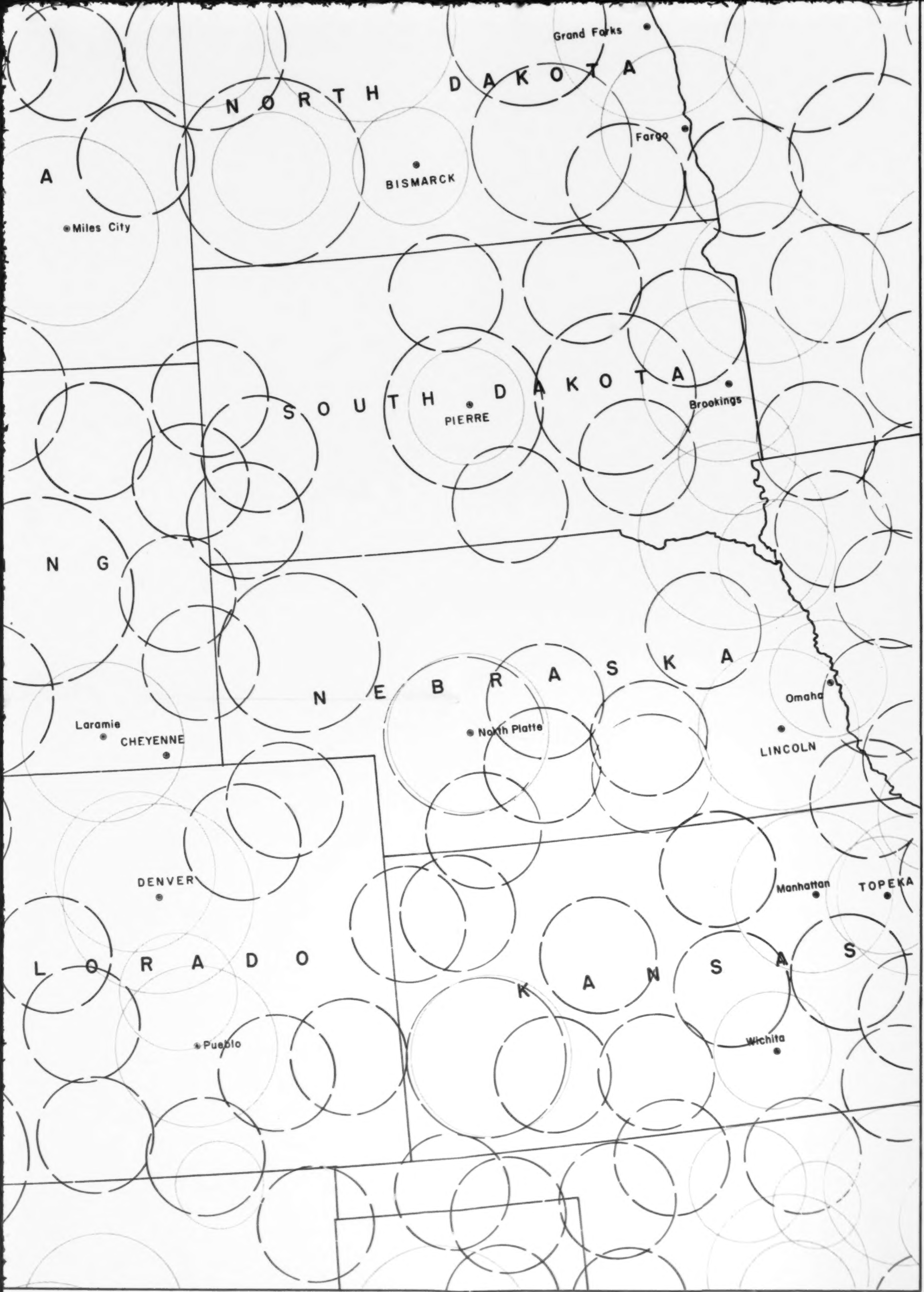
Grand Forks
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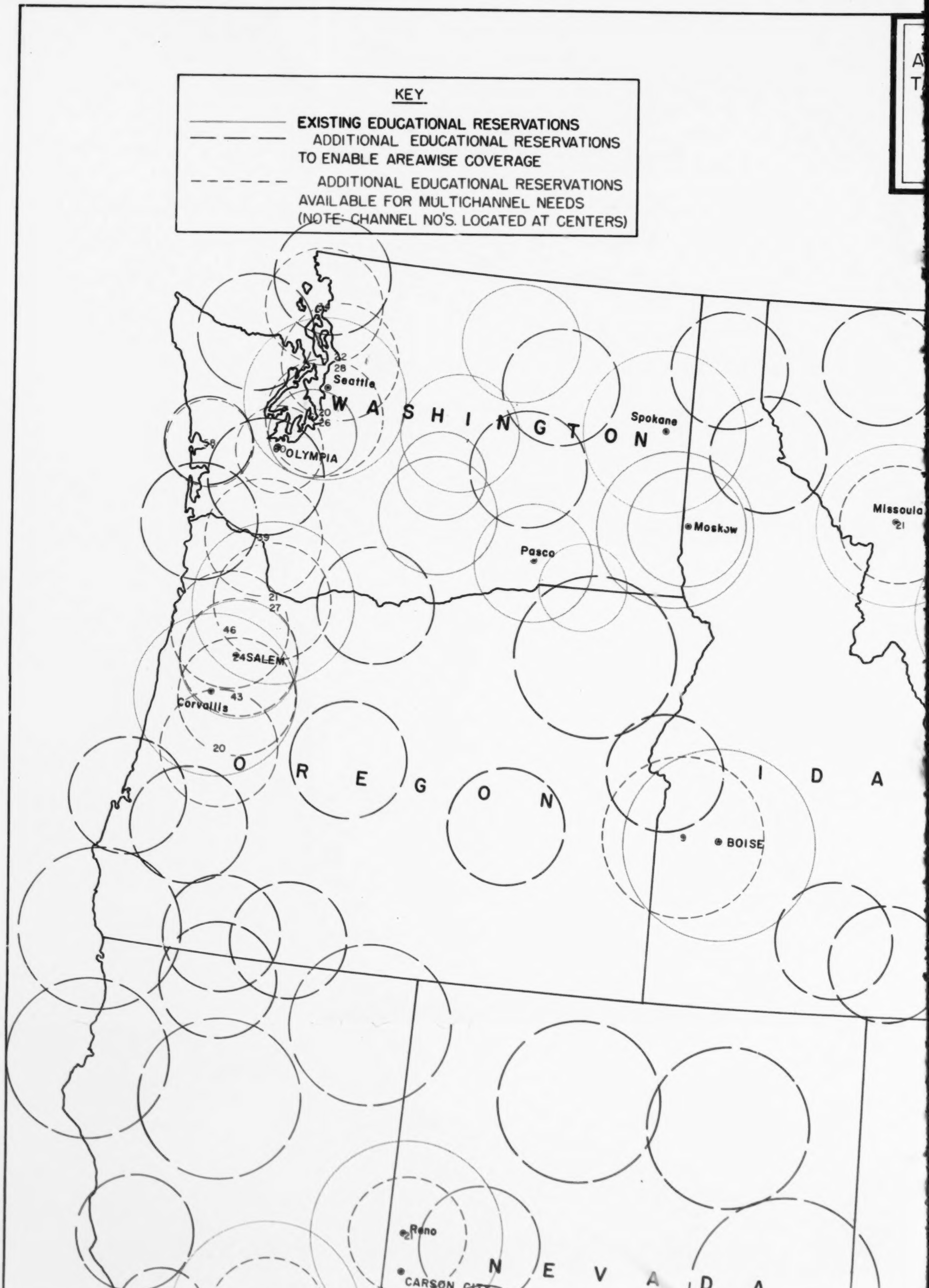
TOPEKA
LORADO
KANSAS
Pueblo
Wichita

1


KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS
(NOTE: CHANNEL NO'S. LOCATED AT CENTERS)
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Spokane
Moskow
Pasco
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Corvallis
43
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OREGON
IDA
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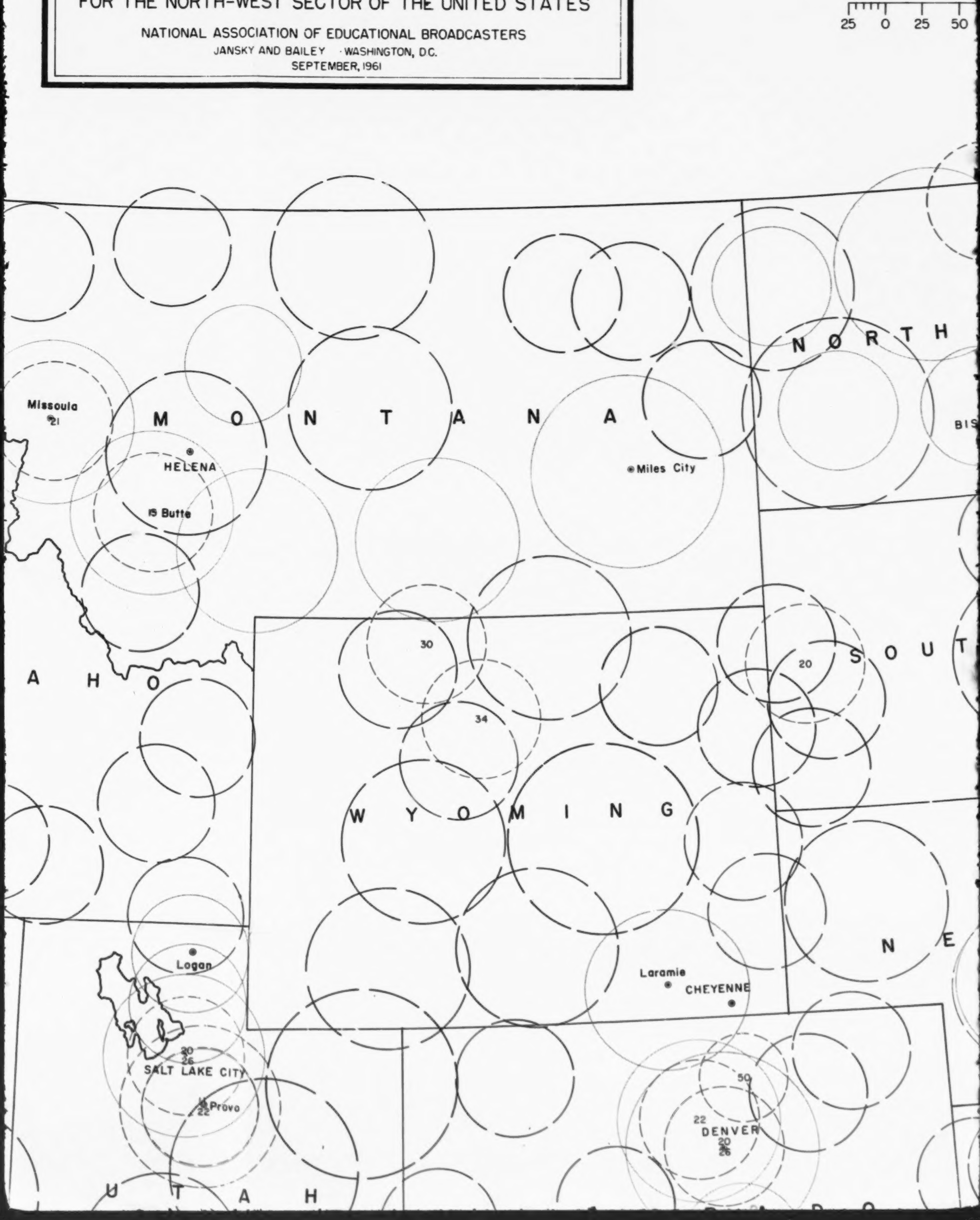
BOISE
Missoula
21
Reno
21
CARSON CITY
NEVADA

2

FIG. 3
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY · WASHINGTON, D.C.
SEPTEMBER, 1961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Logan
Laramie
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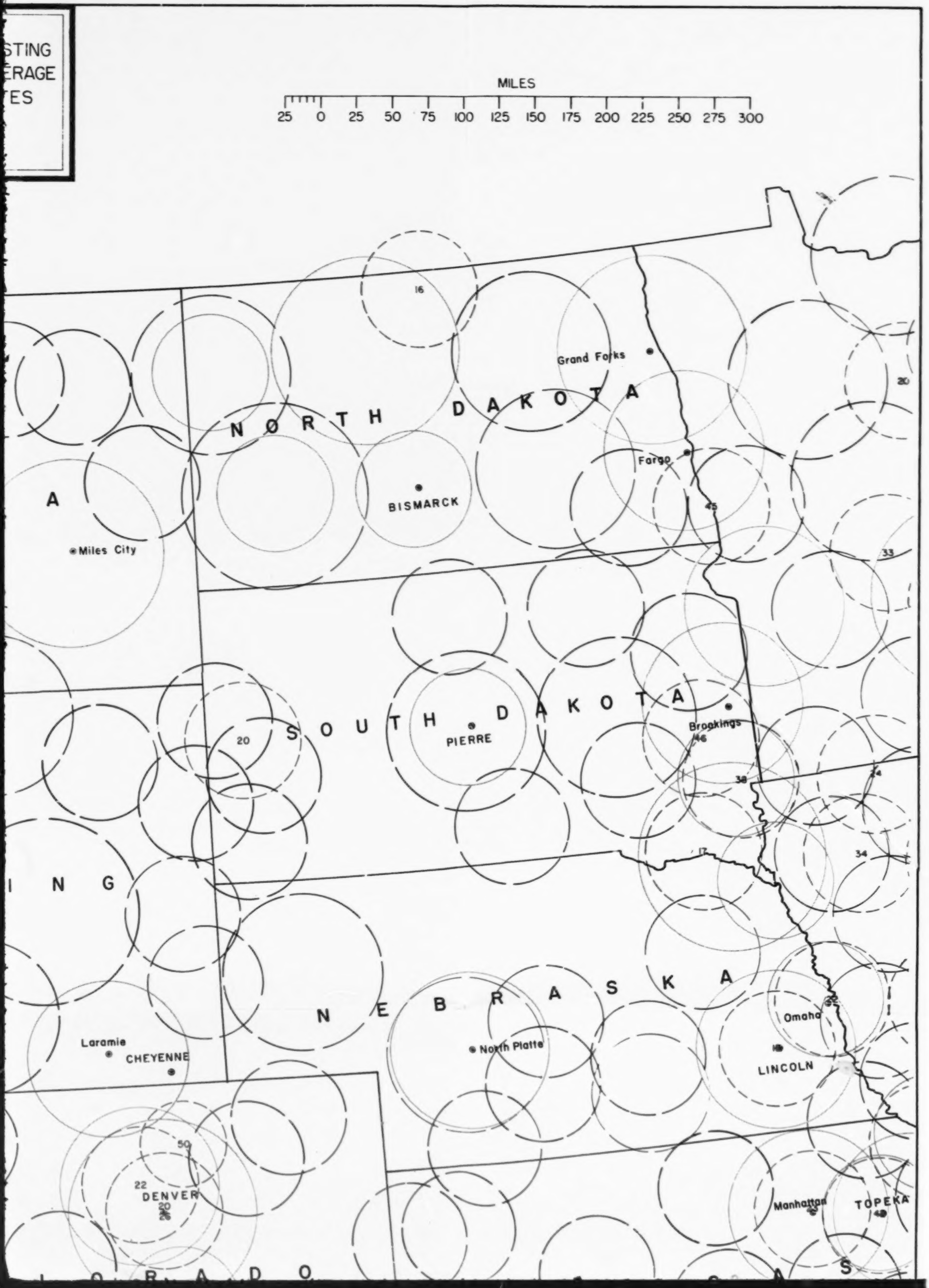
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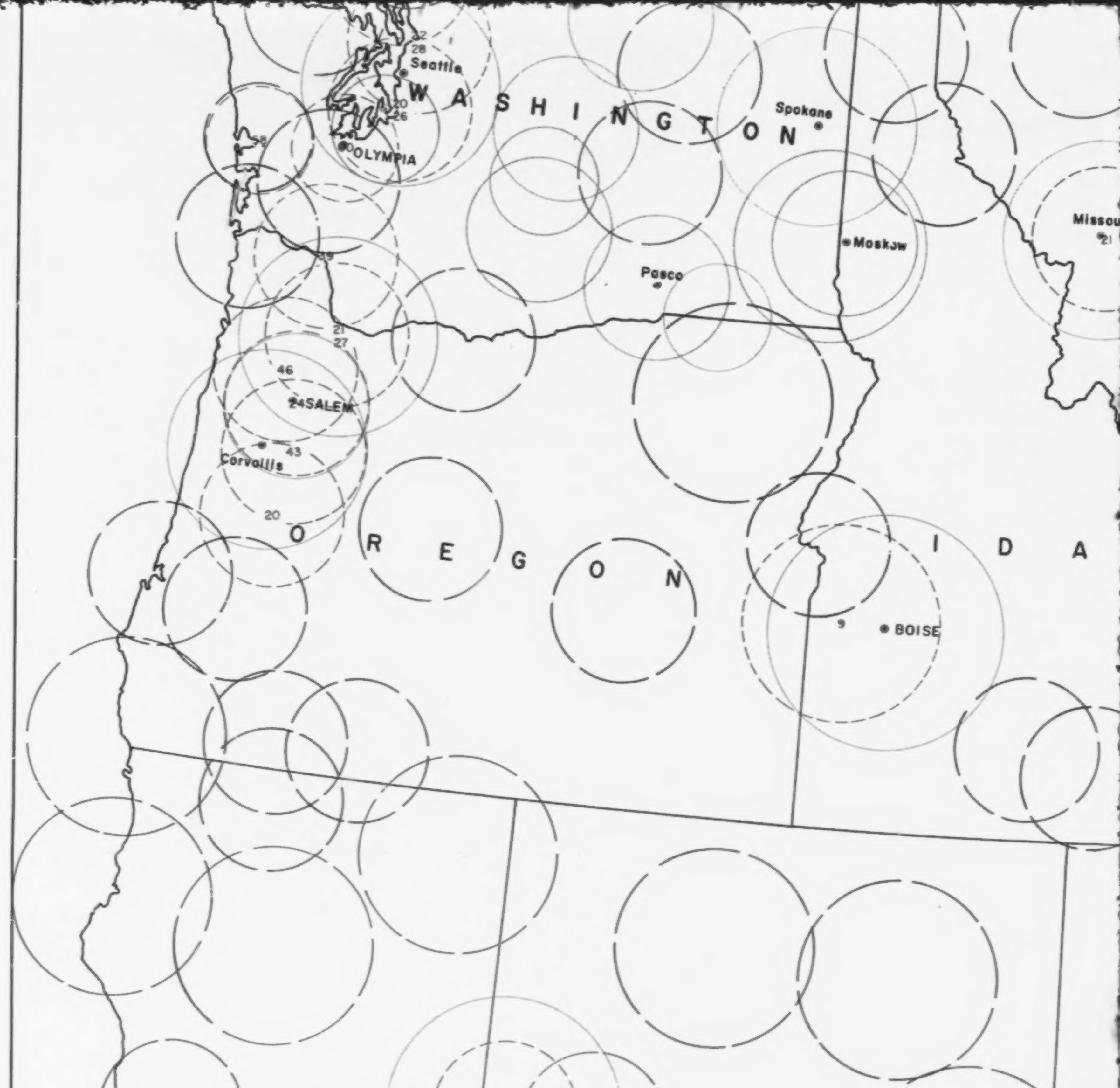
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Corvallis
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BOISE
Reno
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N E V A D A
CARSON CITY
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SACRAMENTO
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San Francisco
44
CALIFORNIA
Fresno
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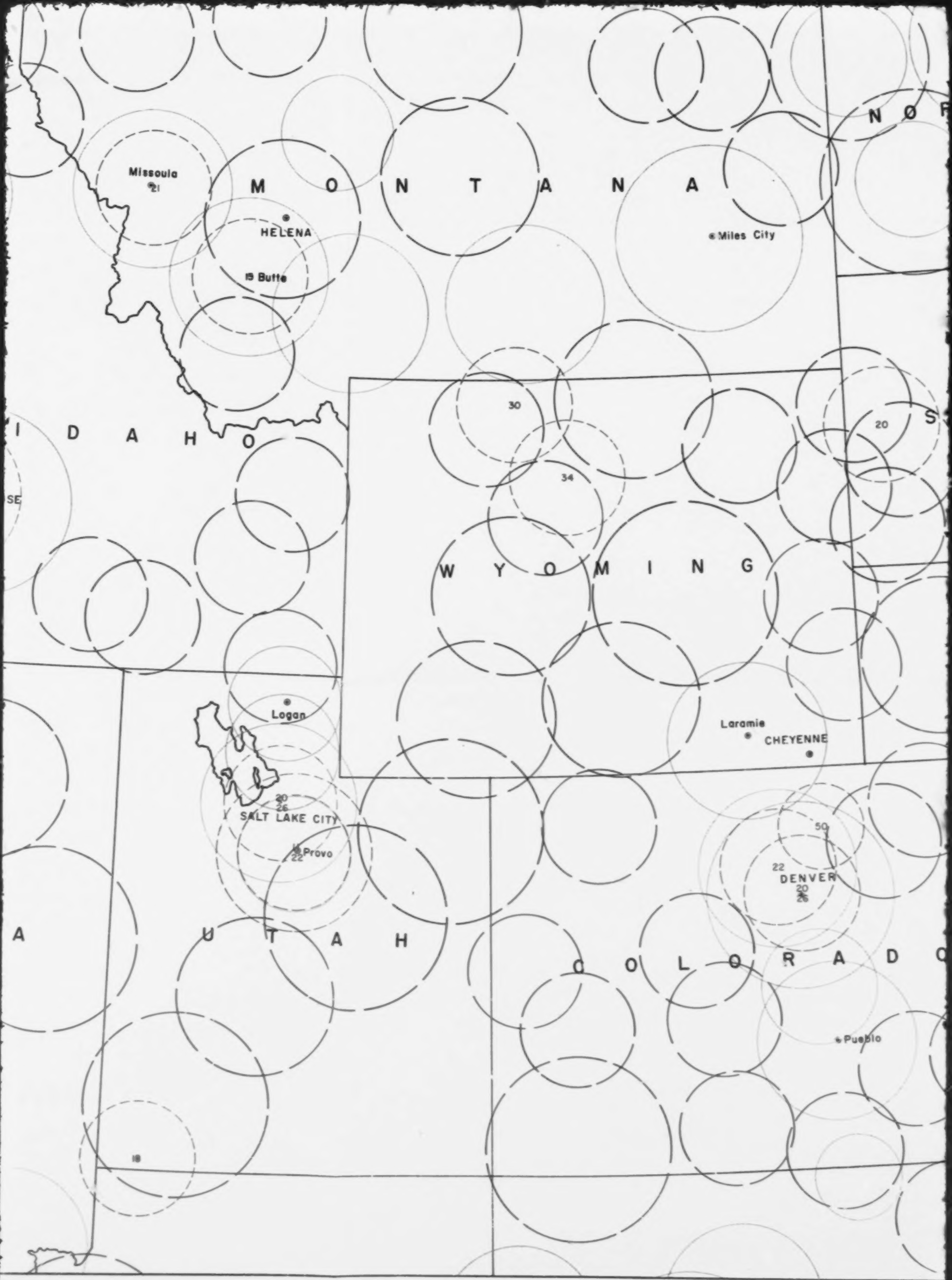
641712 O - 62 (In Pocket)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Laramie
CHEYENNE
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SALT LAKE CITY
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Provo
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DENVER
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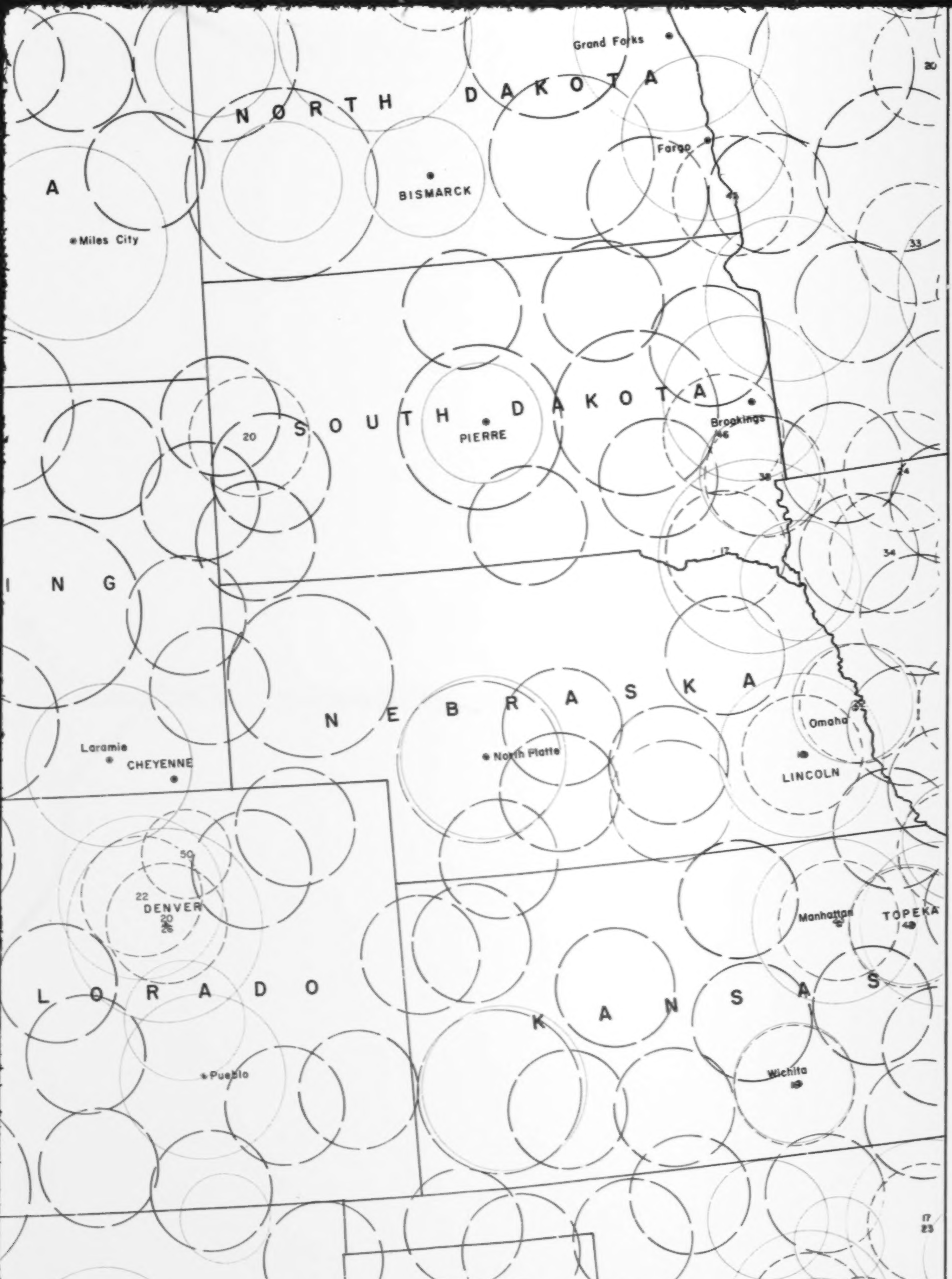
U T A H
C O L O R A D O
Pueblo
18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North Platte
LINCOLN
Laramie
CHEYENNE
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Manhattan
TOPEKA
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KANSAS
Pueblo
Wichita
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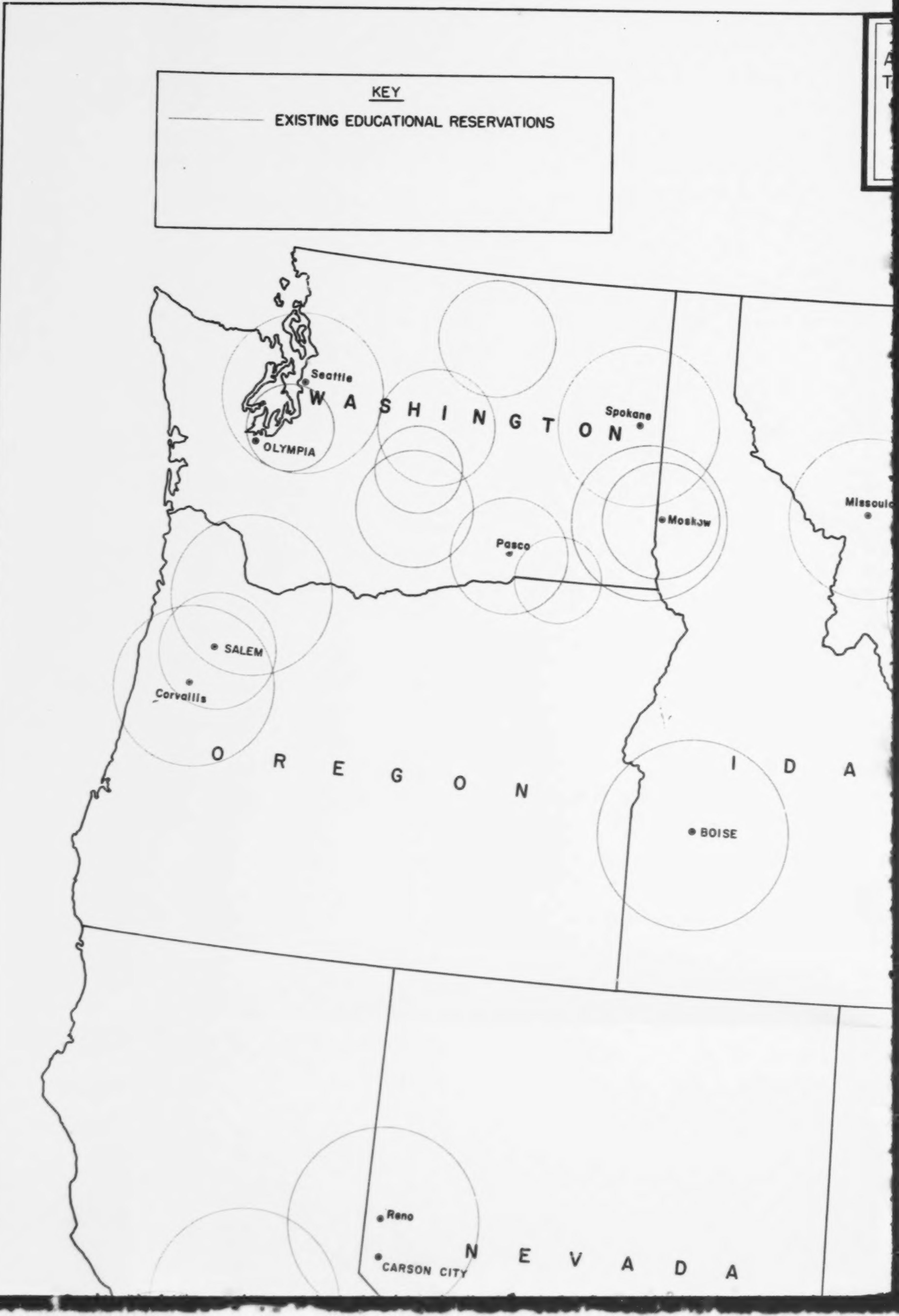
KEY
EXISTING EDUCATIONAL RESERVATIONS
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OLYMPIA
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Corvallis
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BOISE
Reno
CARSON CITY
NEVADA

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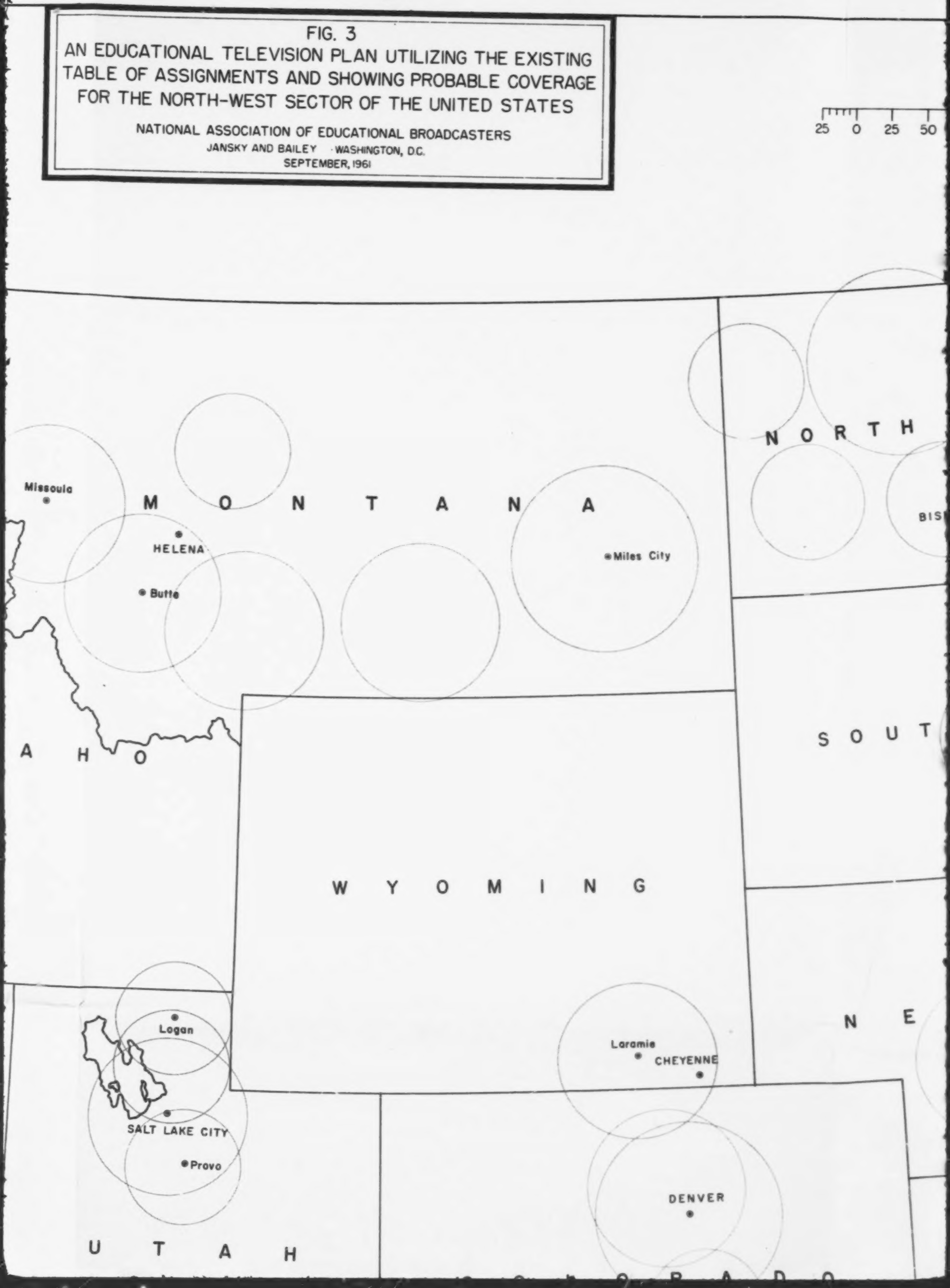

FIG. 3
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE NORTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY · WASHINGTON, D.C.
SEPTEMBER, 1961

25 0 25 50
MONTANA
Missoula
HELENA
Butte
Miles City
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Logan
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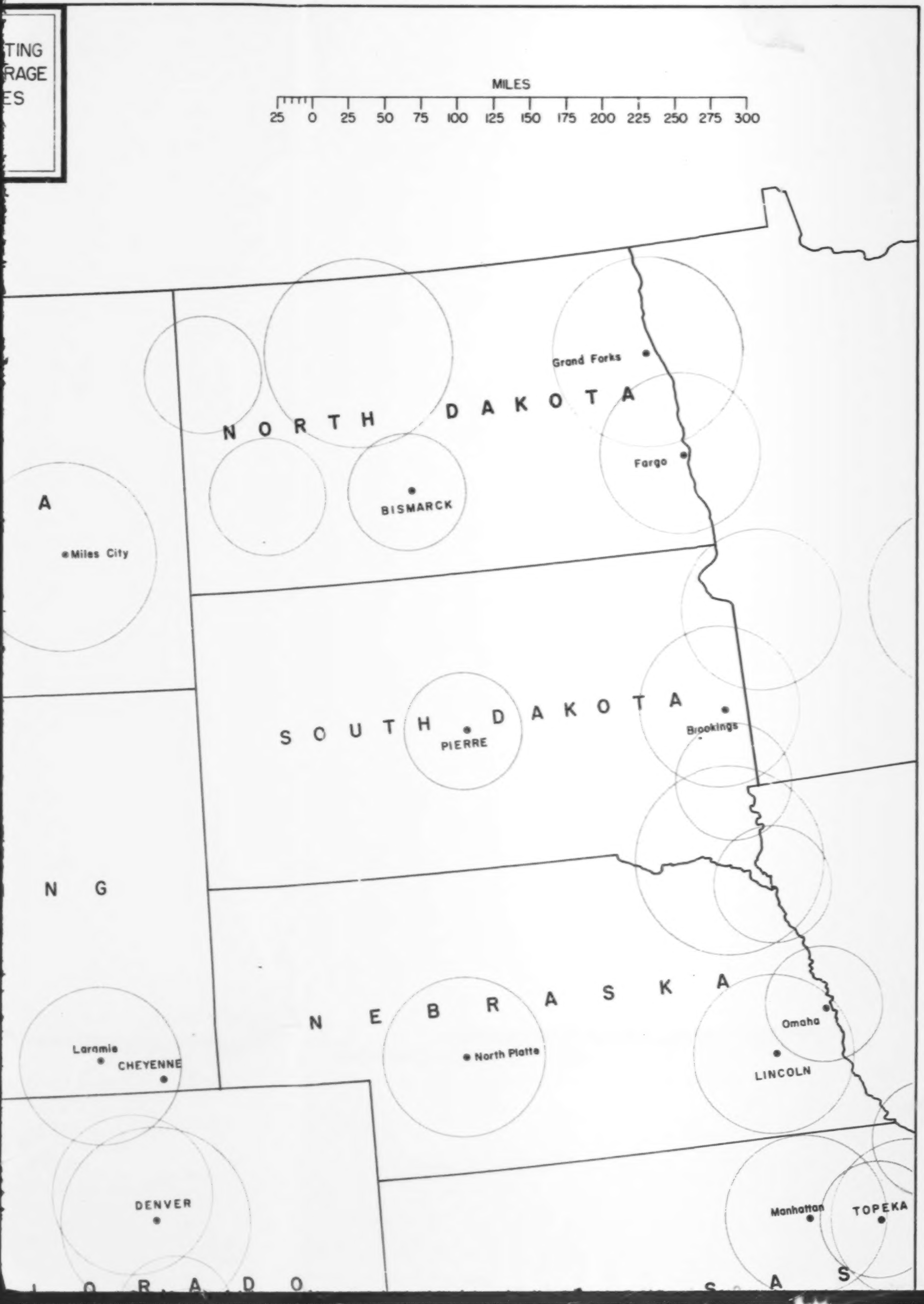
Provo
UTAH
Laramie
CHEYENNE
DENVER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LORADO
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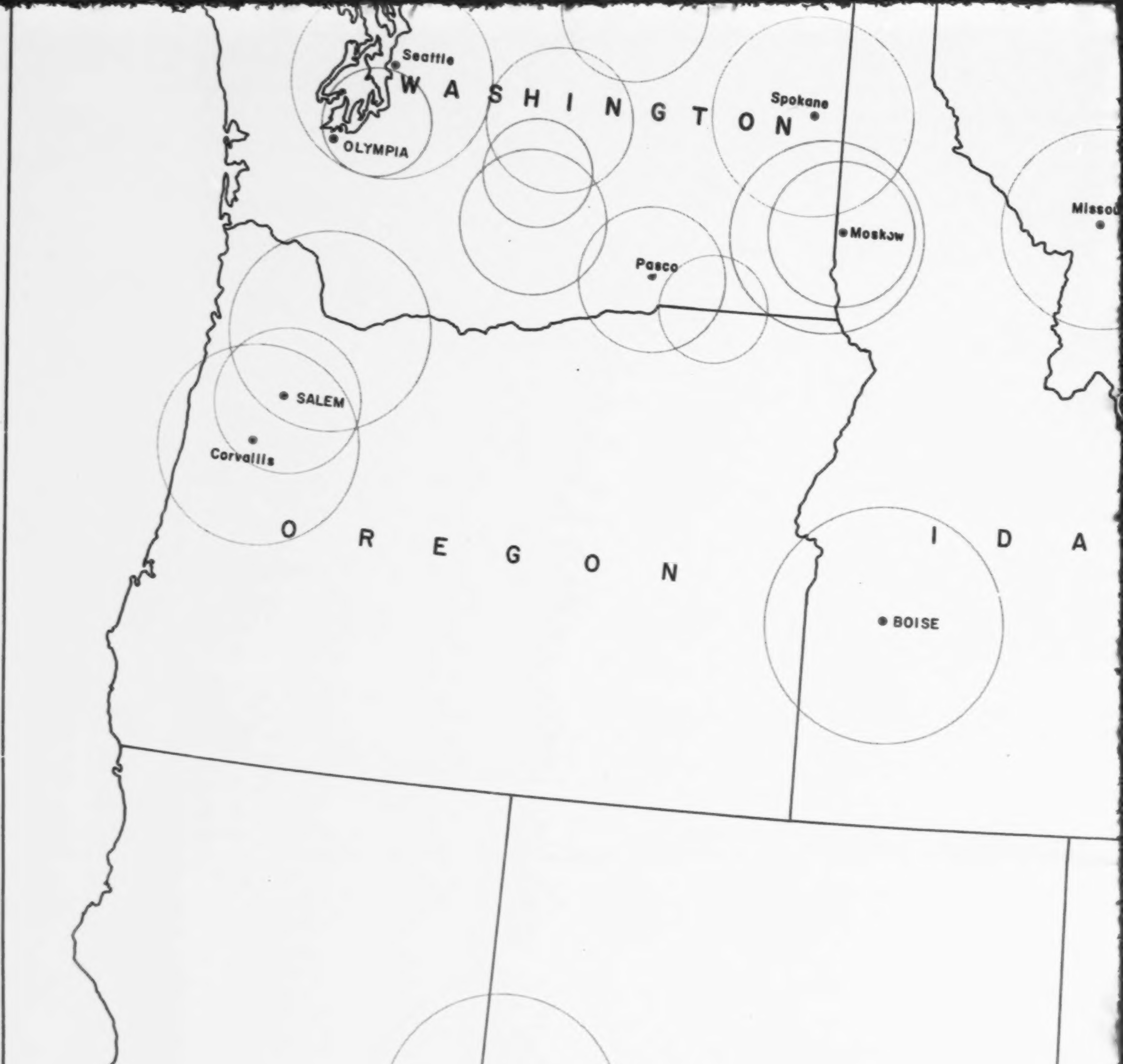
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Pasco
SALEM
Corvallis
OREGON
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SACRAMENTO
San Francisco
CALIFORNIA
Fresno

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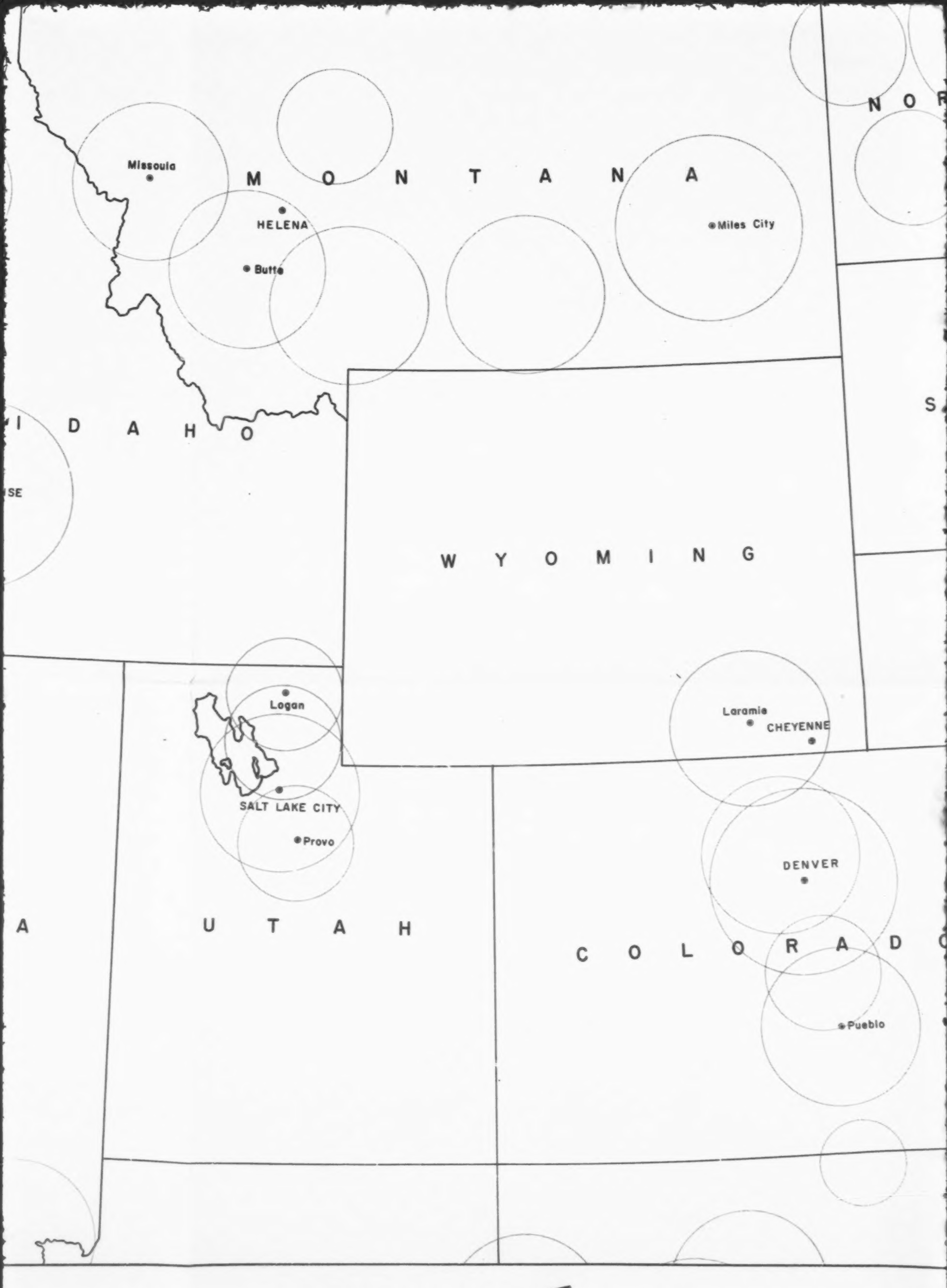
M O N T A N A
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HELENA
Butte
Miles City
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W Y O M I N G
Logan
SALT LAKE CITY
Provo
Laramie
CHEYENNE
U T A H
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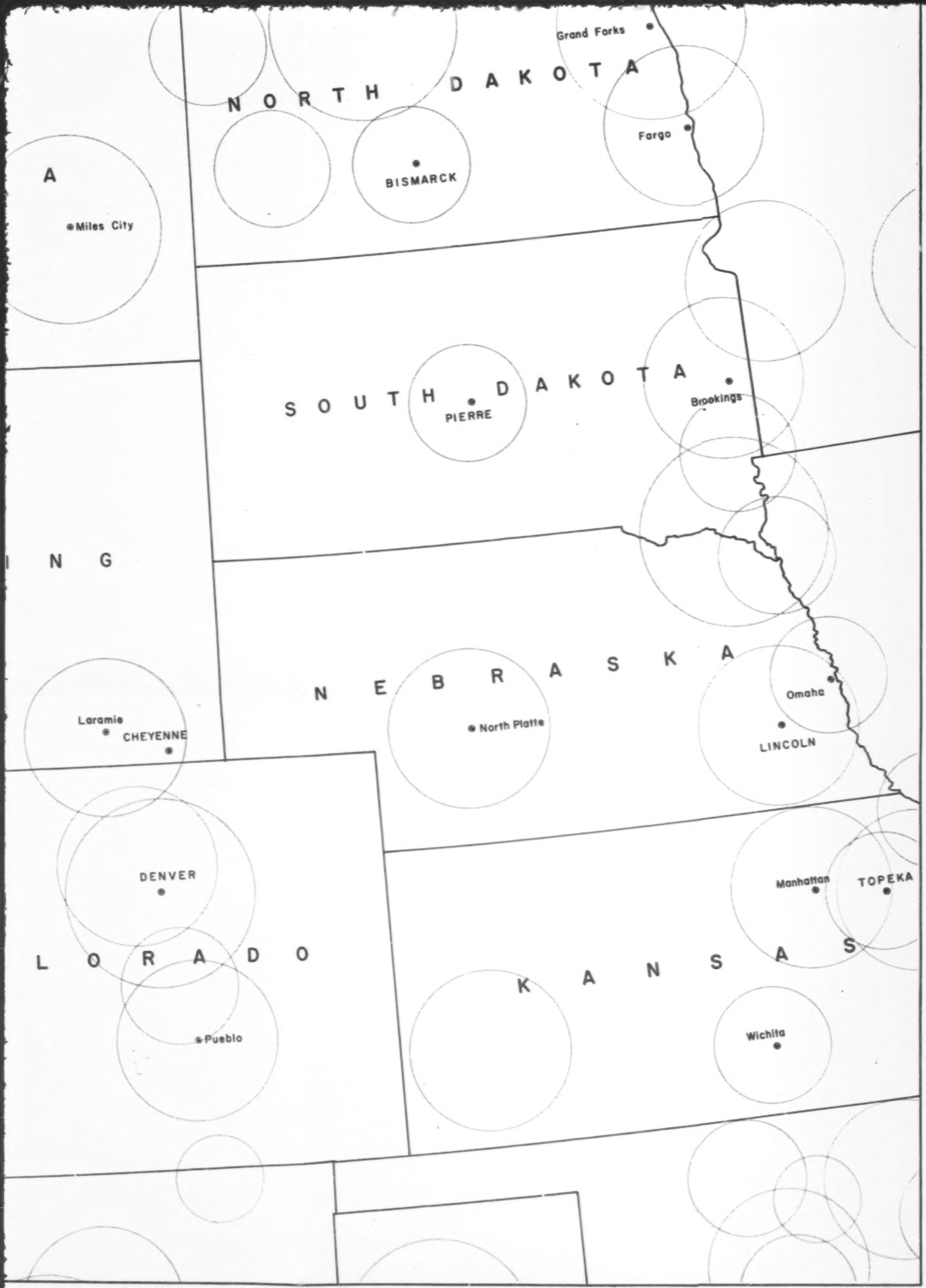
DENVER
C O L O R A D
Pueblo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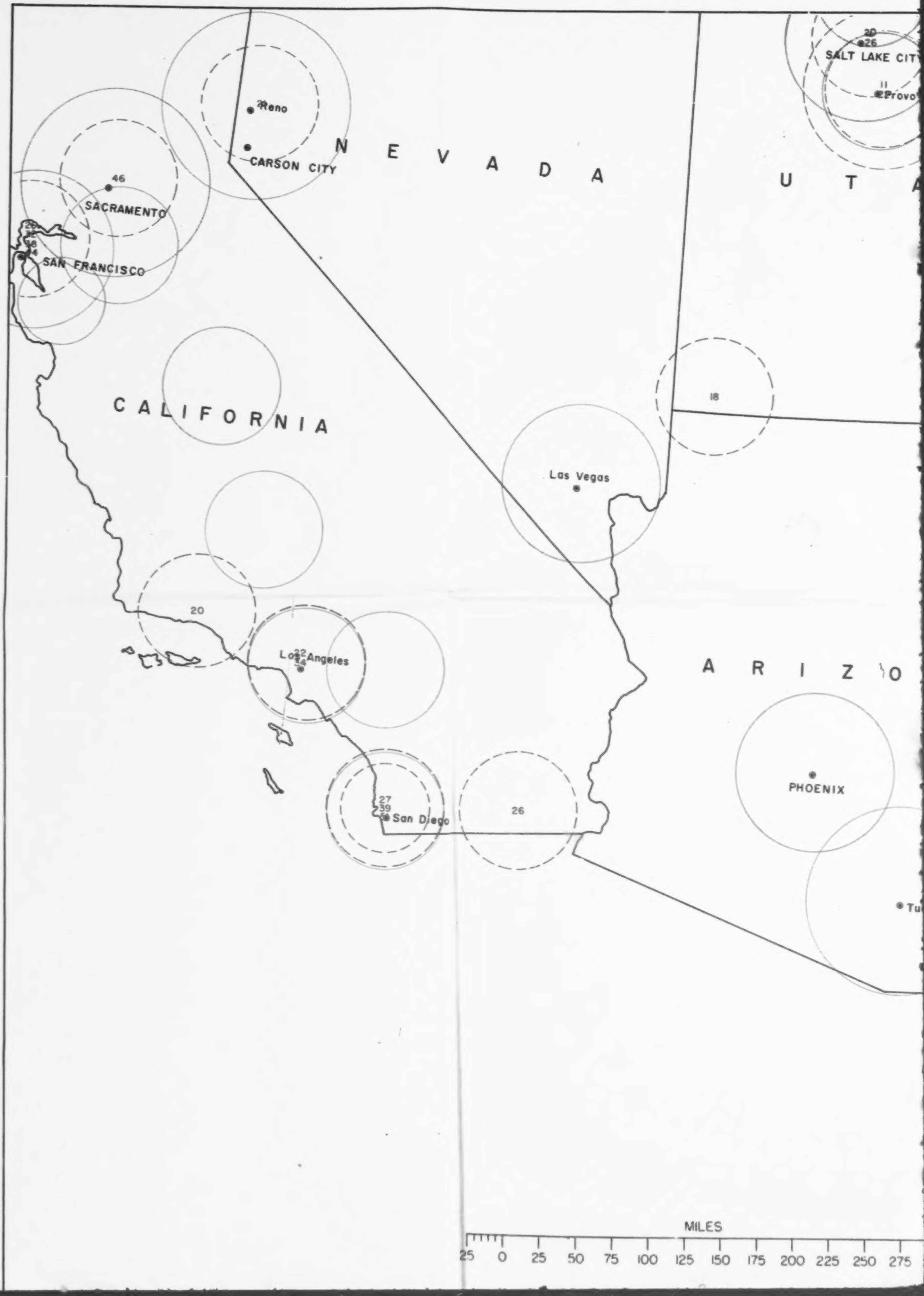
Omaha
LINCOLN
North Platte
Laramie
CHEYENNE
DENVER
LORADO
Pueblo
Manhattan
TOPEKA
KANSAS
Wichita

6

1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SACRAMENTO
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SAN FRANCISCO
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Las Vegas
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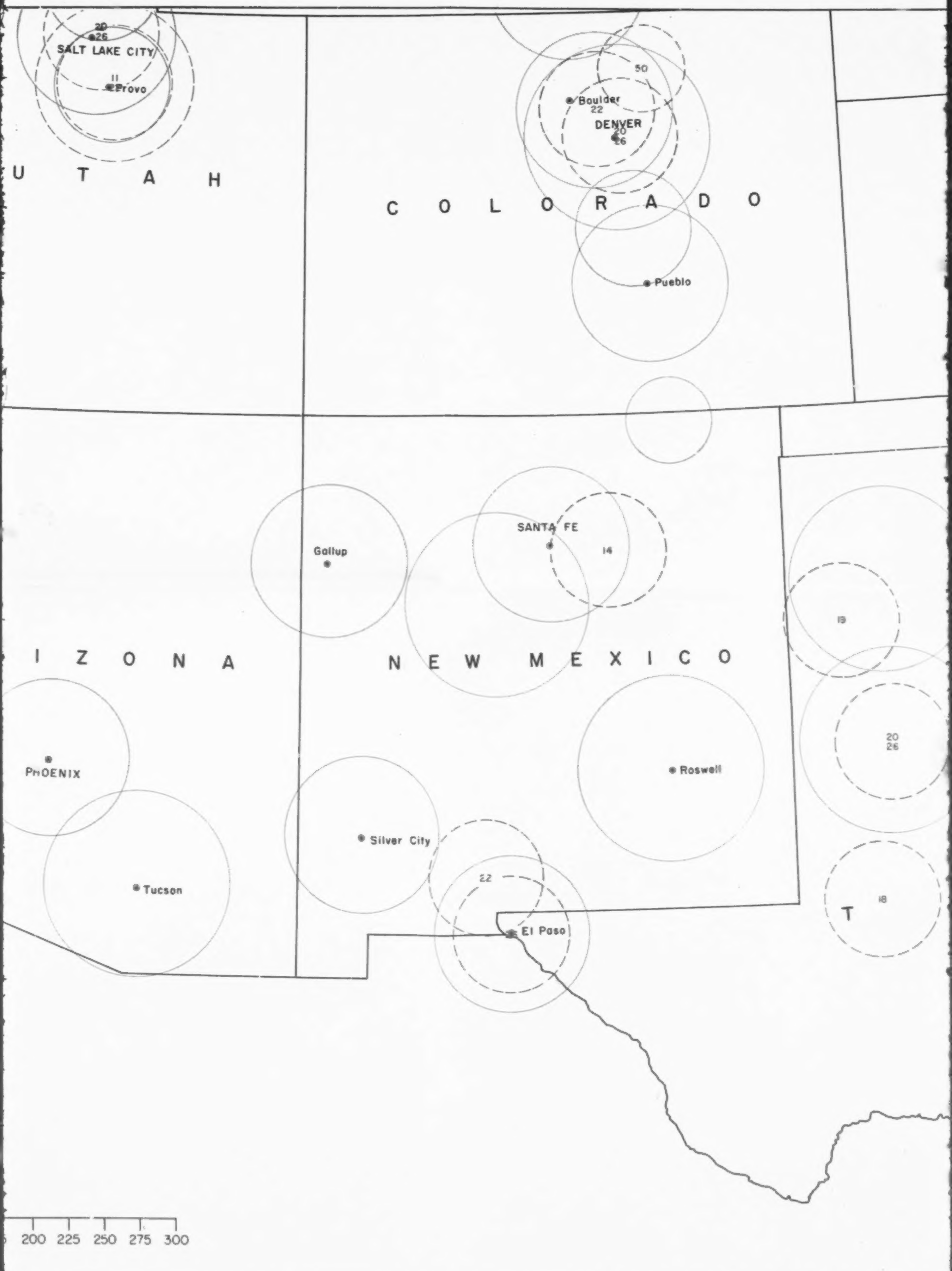
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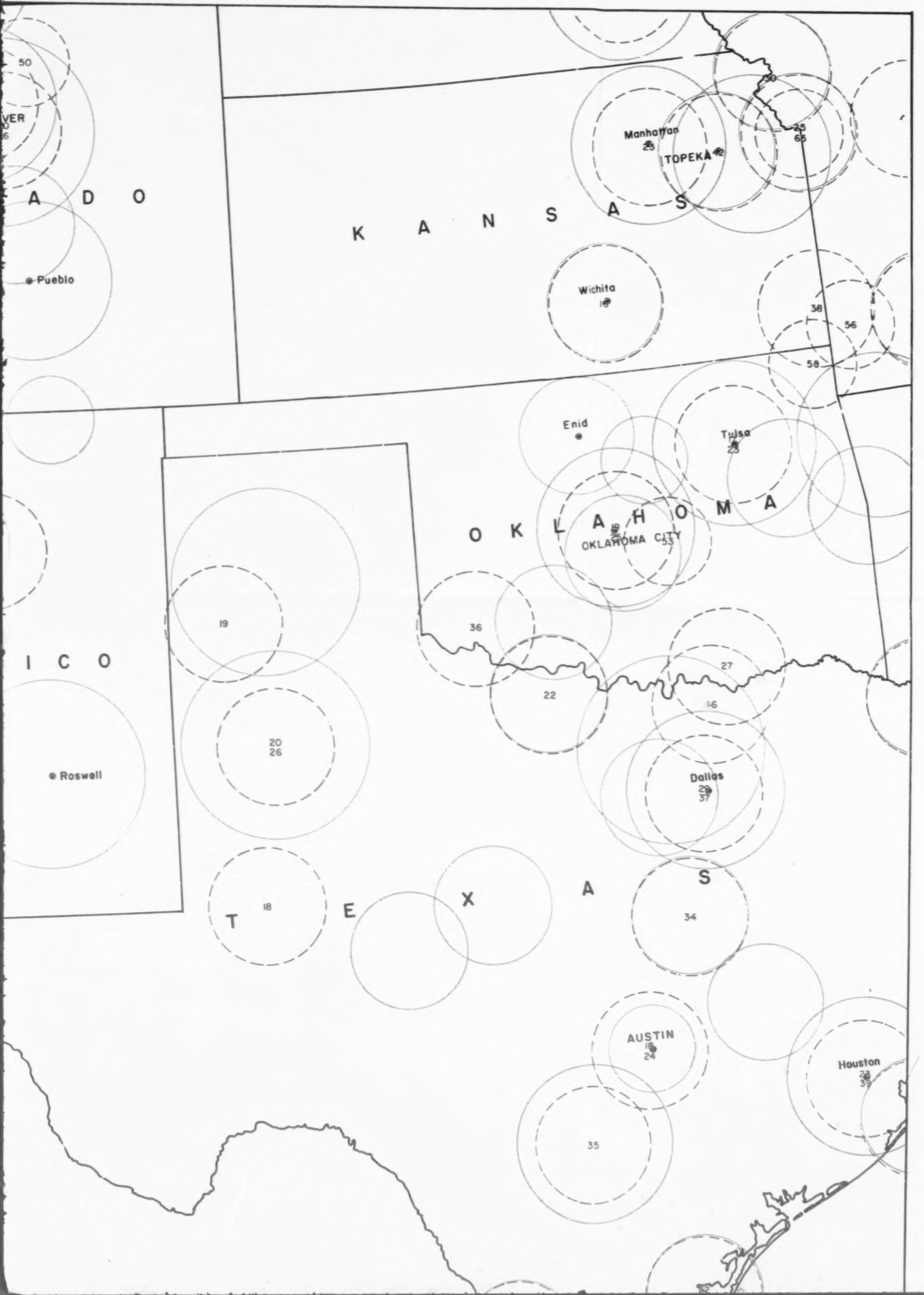
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Enid
Tulsa
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O K L A H O M A
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OKLAHOMA CITY
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I C O
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Dallas
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AUSTIN
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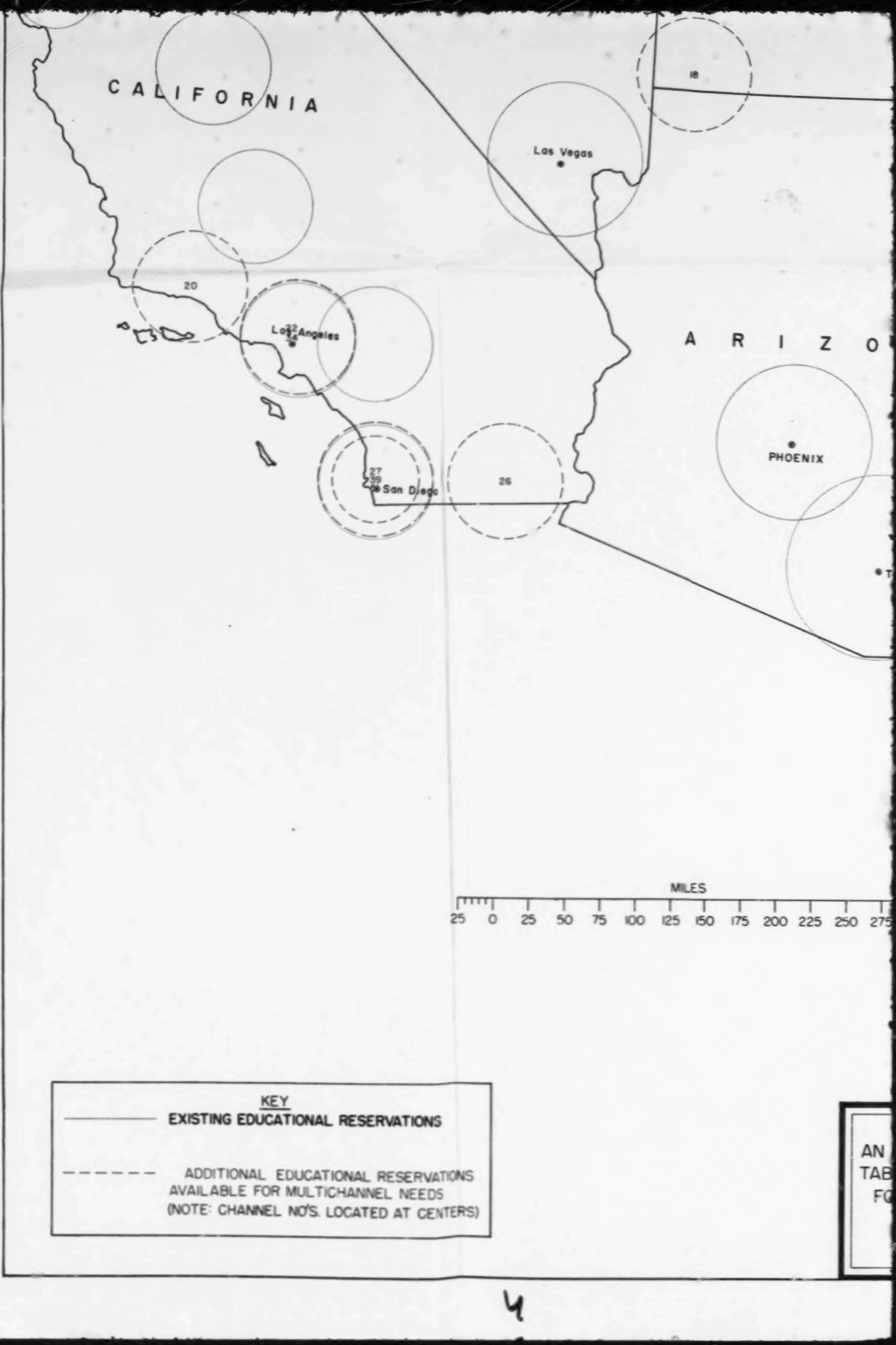
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MILES
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KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS (NOTE: CHANNEL NO'S. LOCATED AT CENTERS)
AN
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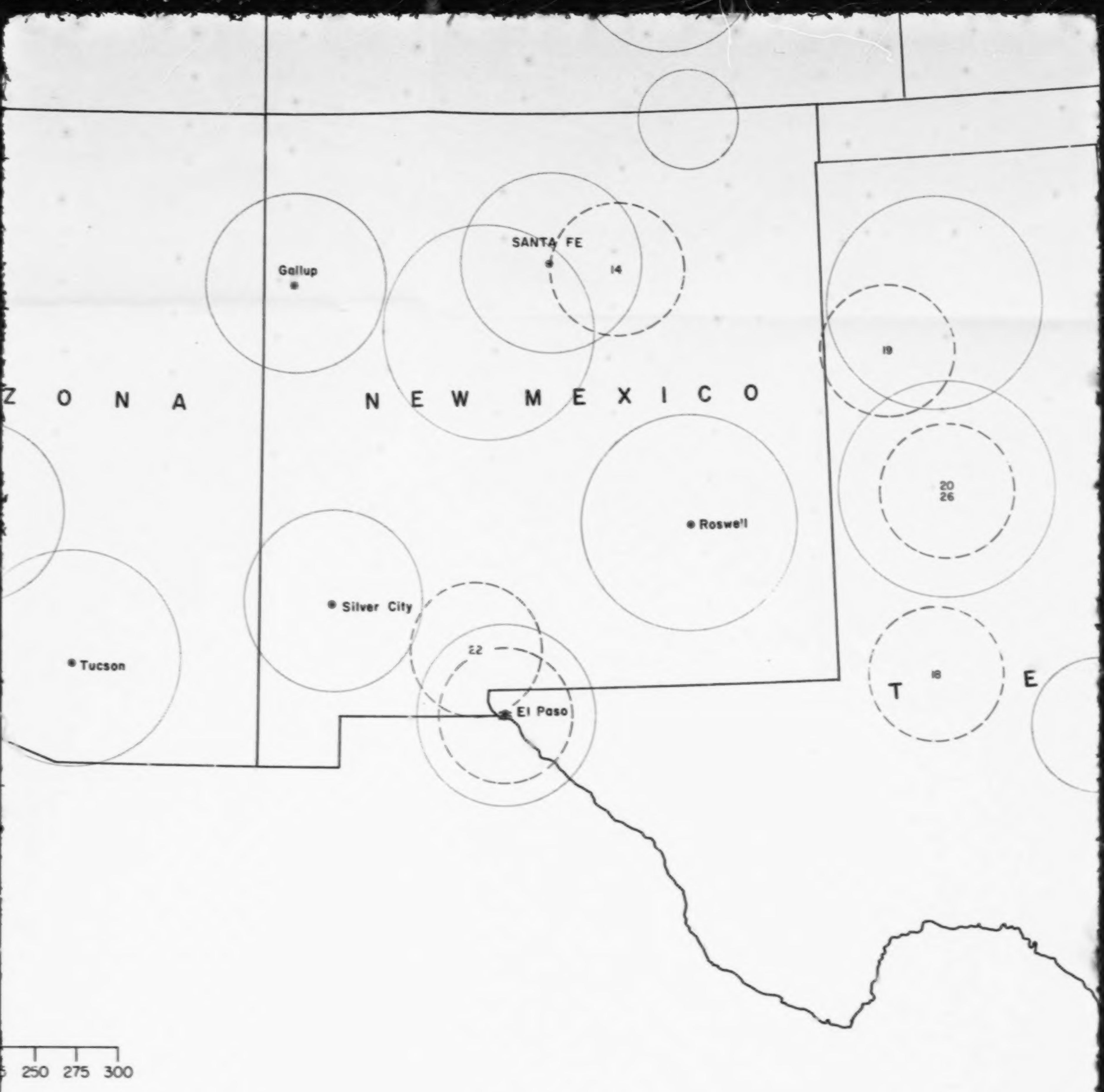
641712 O - 62 (In Pocket)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NEW MEXICO
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El Paso
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FIG. 4
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER, 1961

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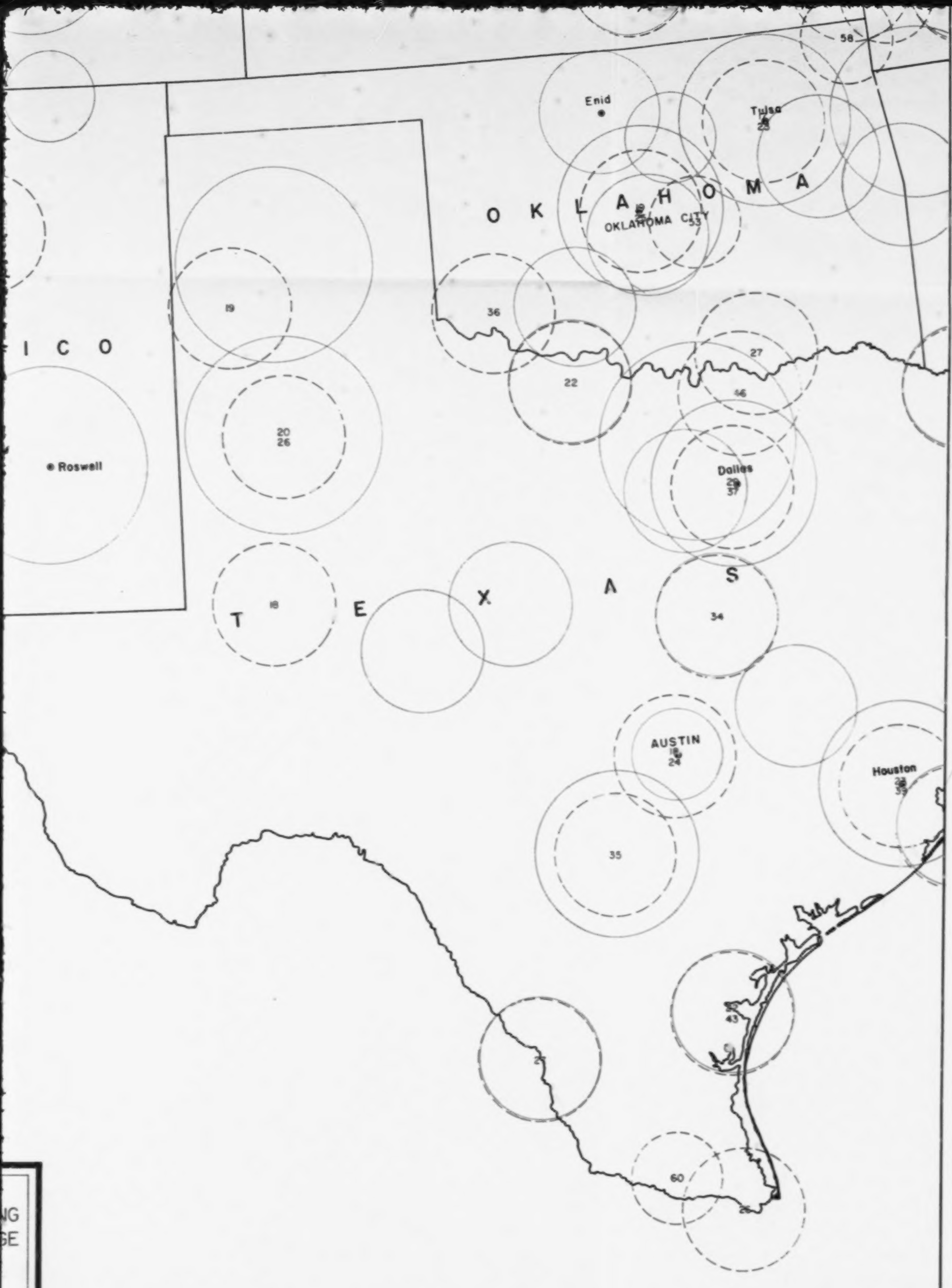
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Tulsa
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OKLAHOMA CITY
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Roswell
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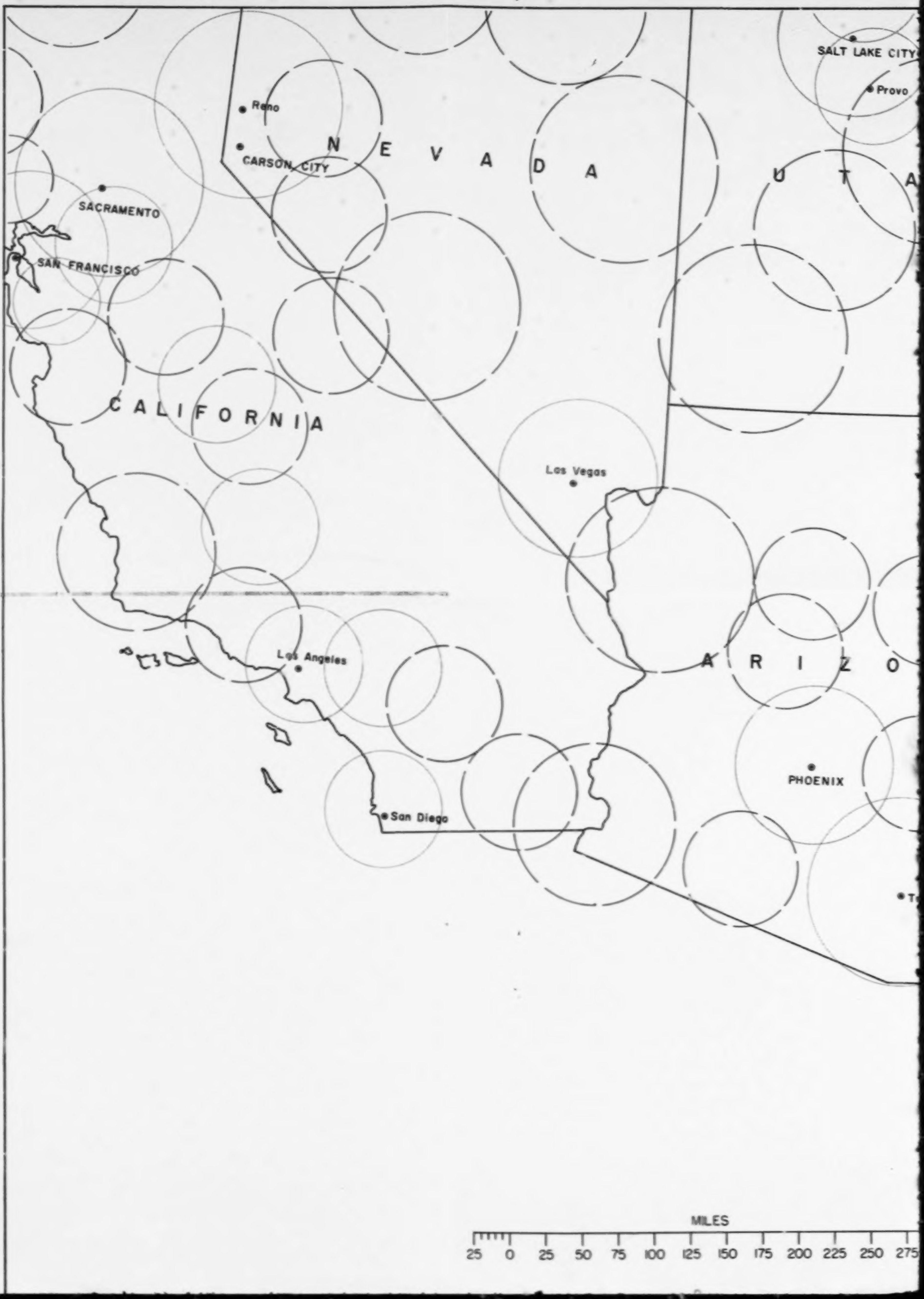
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Reno
NEVADA
CARSON CITY
UTA
SACRAMENTO
SAN FRANCISCO
CALIFORNIA
Las Vegas
ARIZO
Los Angeles
San Diego
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MILES
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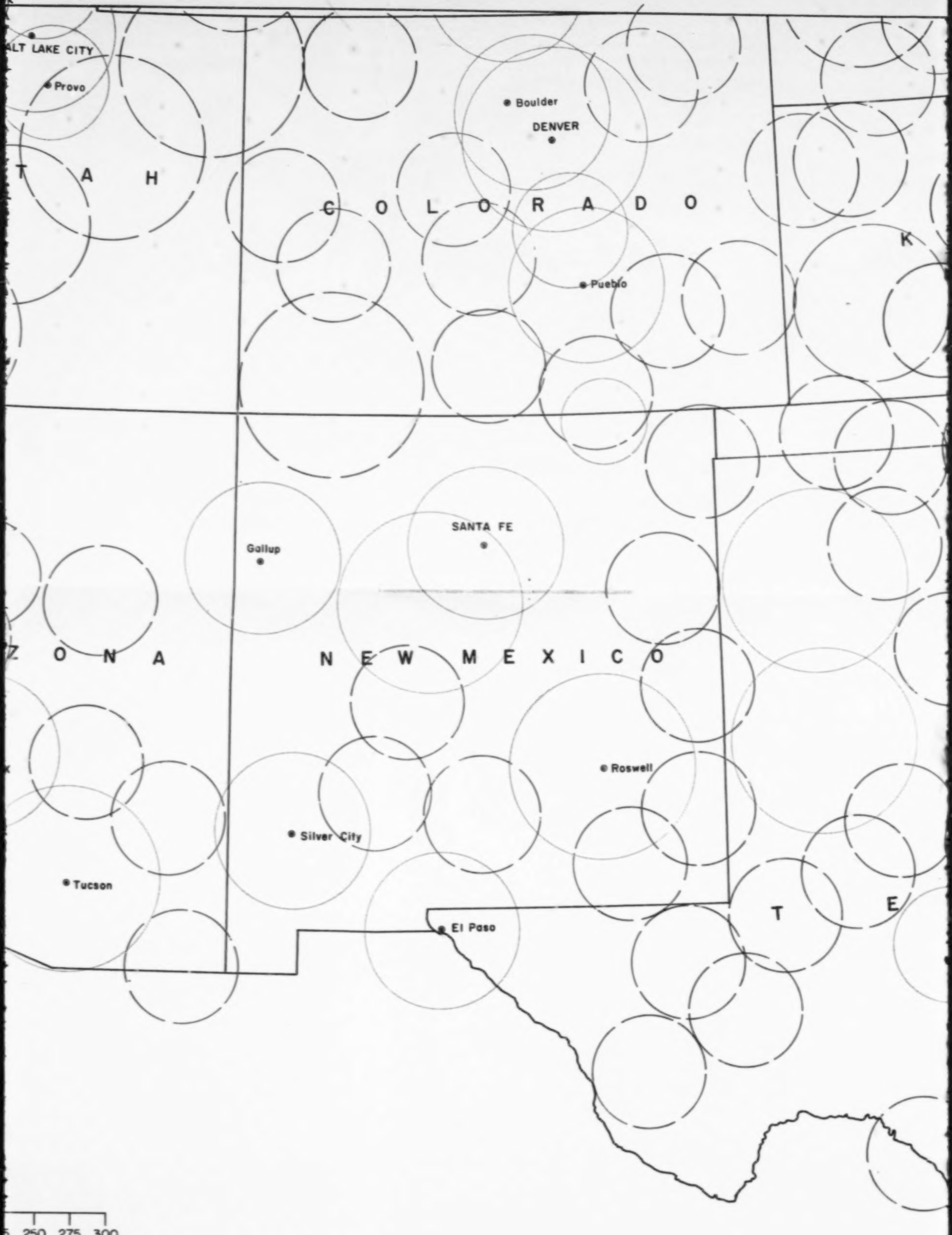
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Provo
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DENVER
COLORADO
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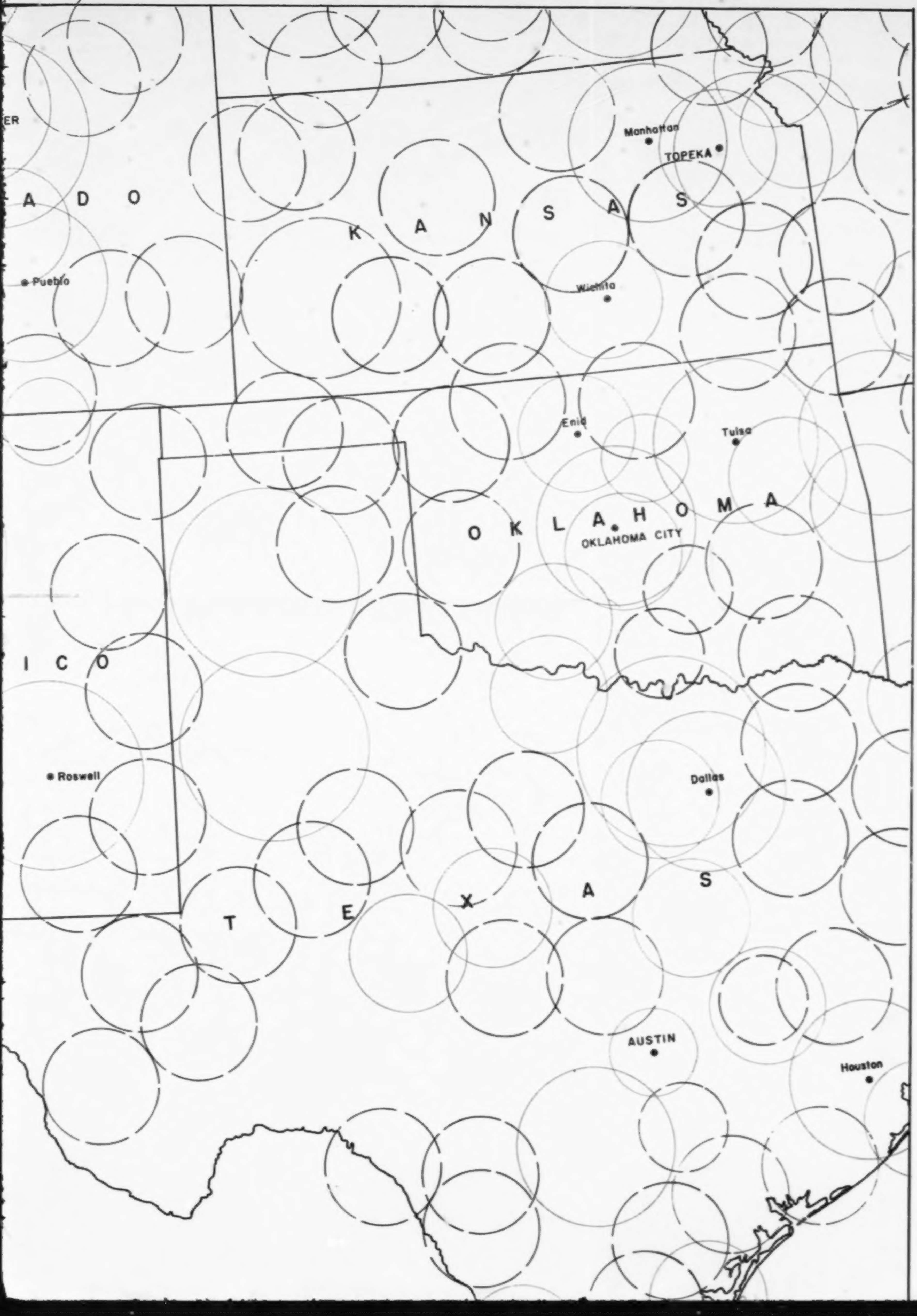
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ADO
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ICO
Roswell
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Manhattan
TOPEKA
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OKLAHOMA CITY
Dallas
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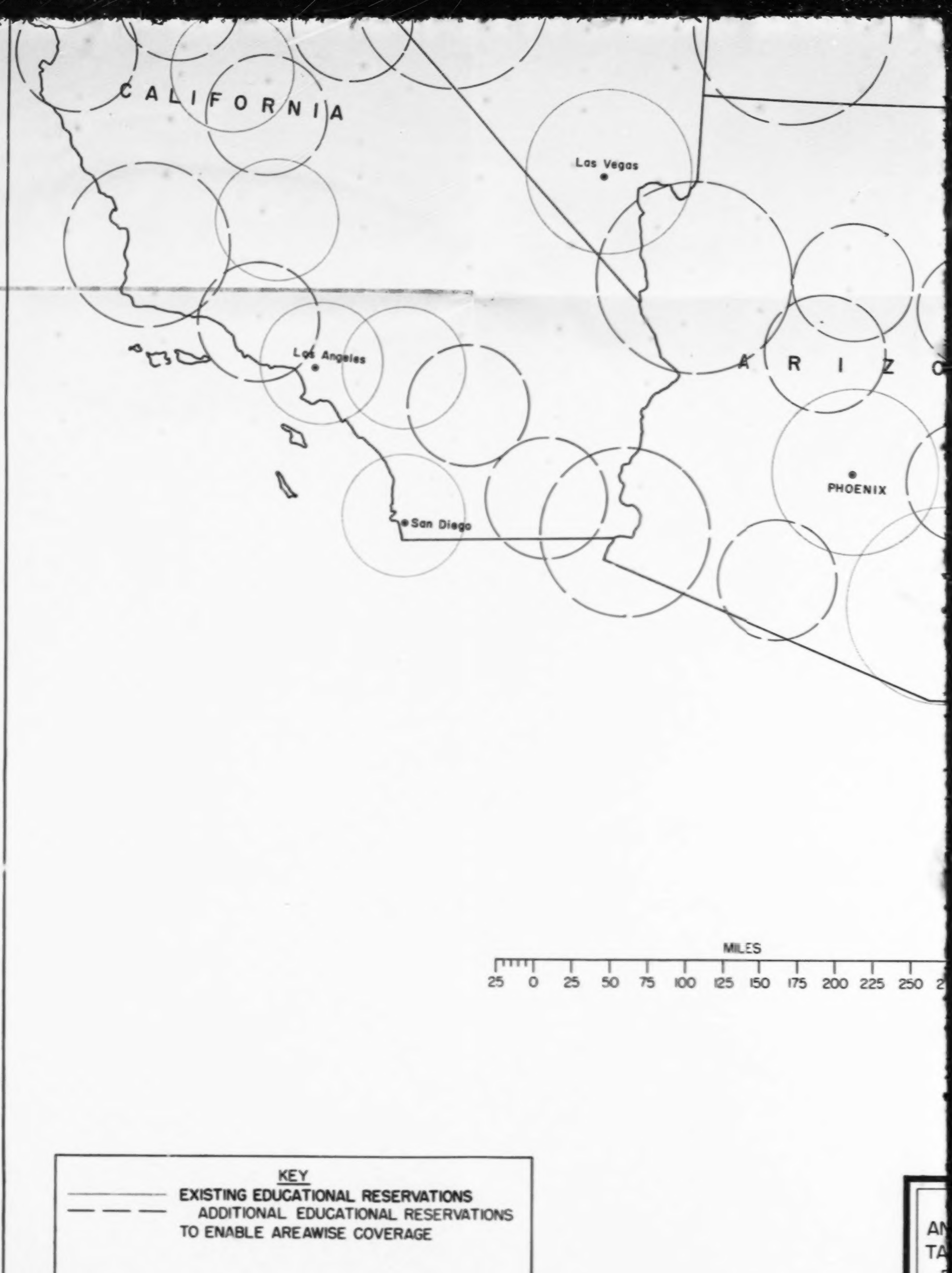
AUSTIN
Houston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Las Vegas
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KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
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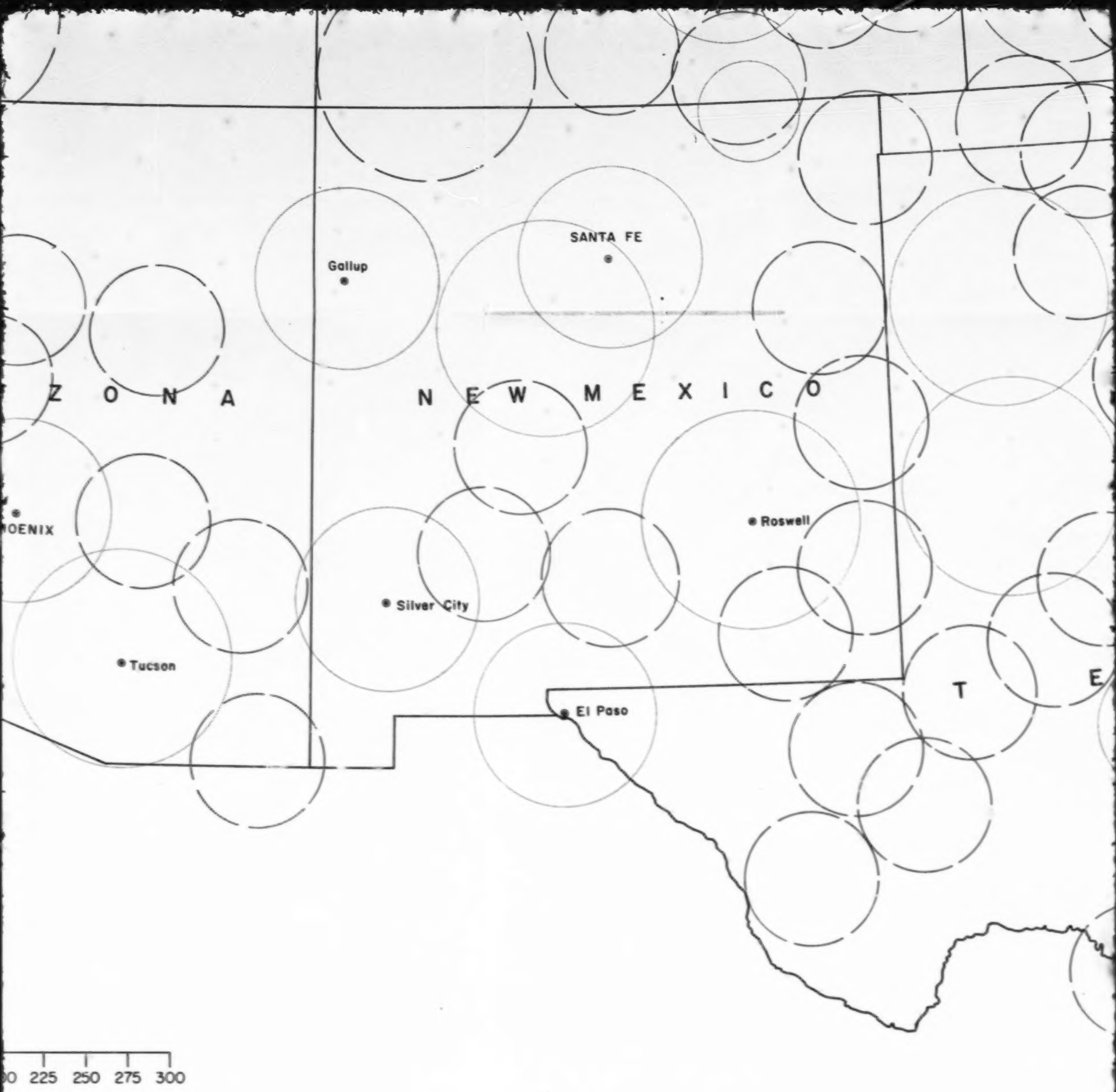
SANTA FE
Gallup
ZONA
NEW MEXICO
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Roswell
Silver City
Tucson
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FIG. 4
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER, 1961

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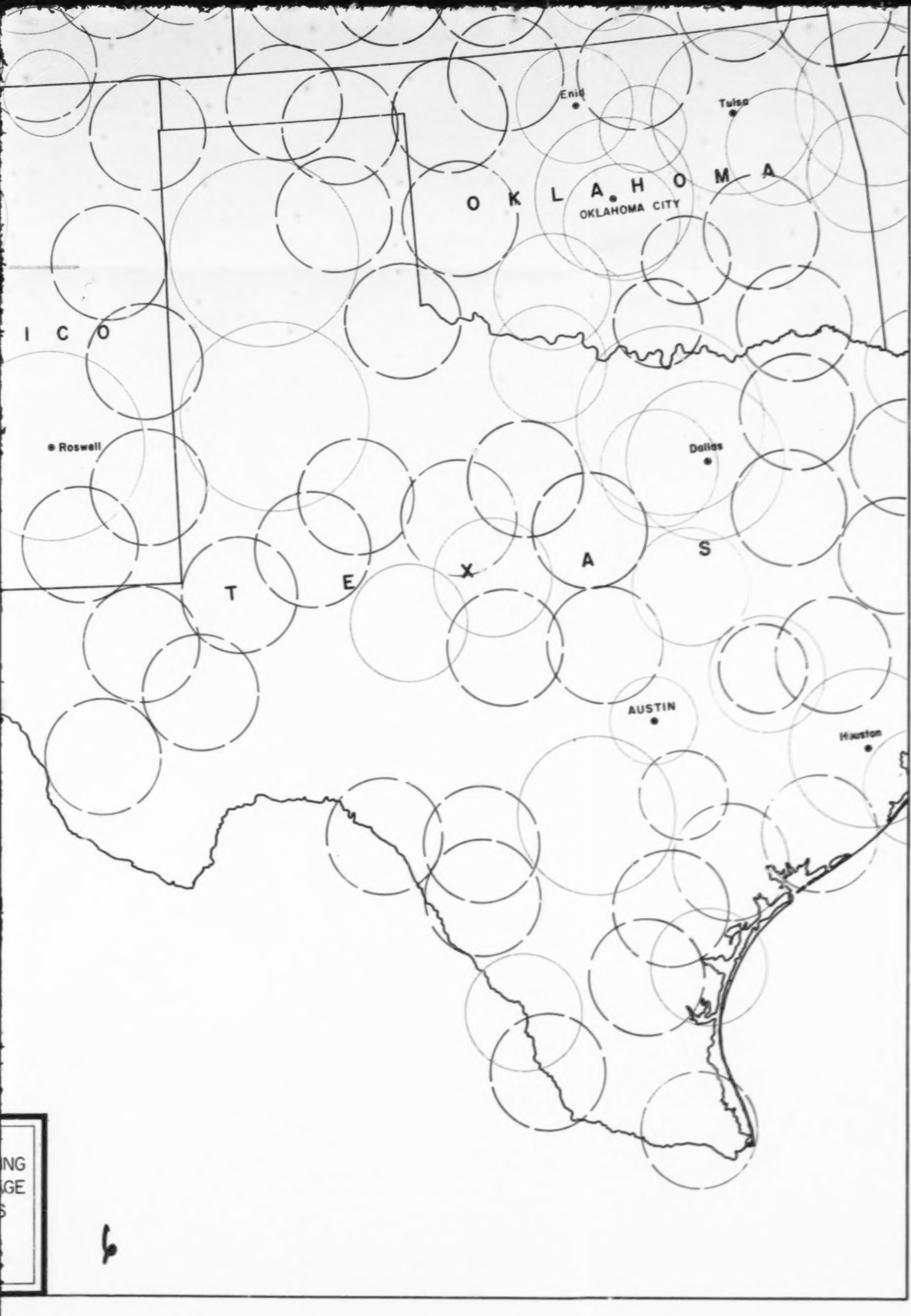
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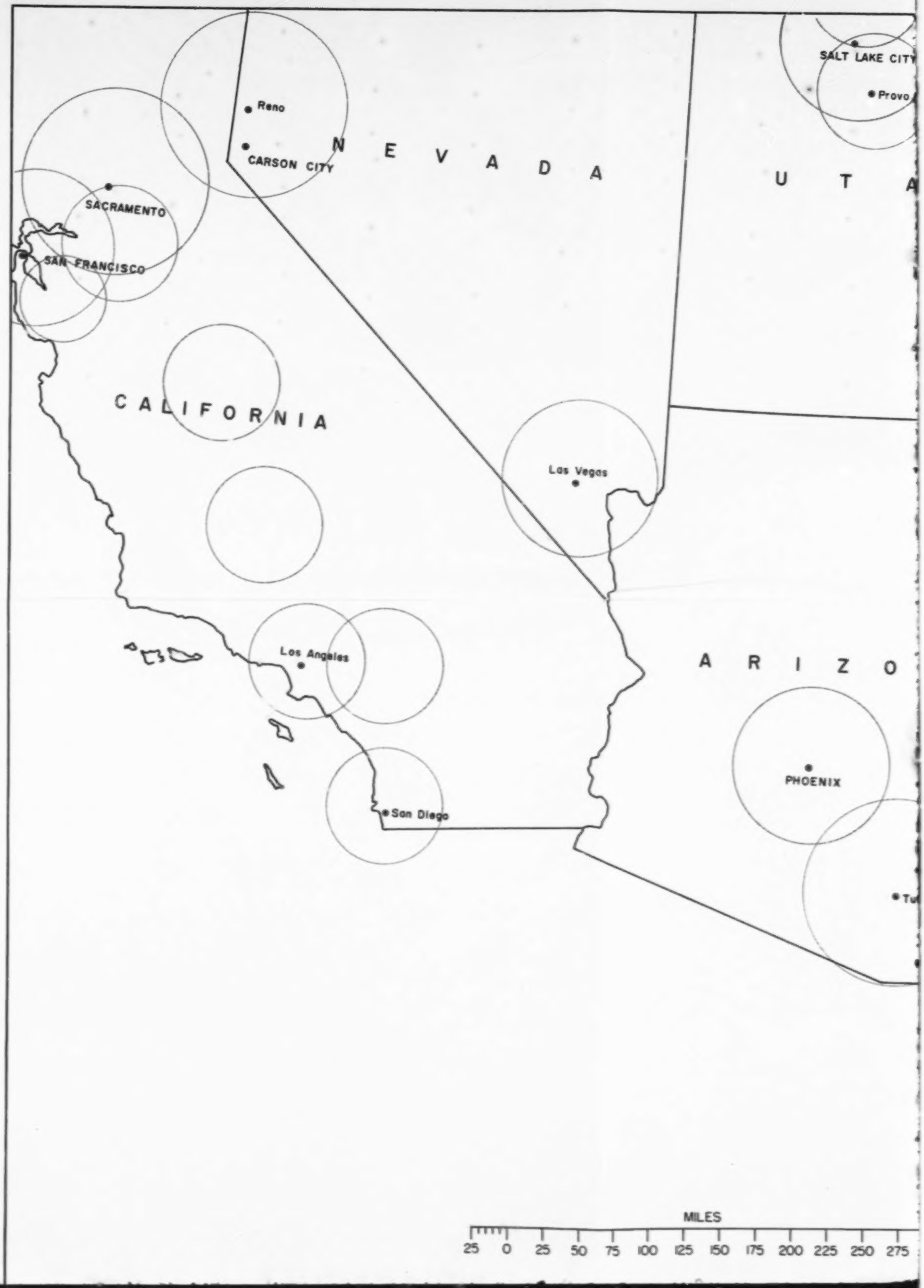
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Provo
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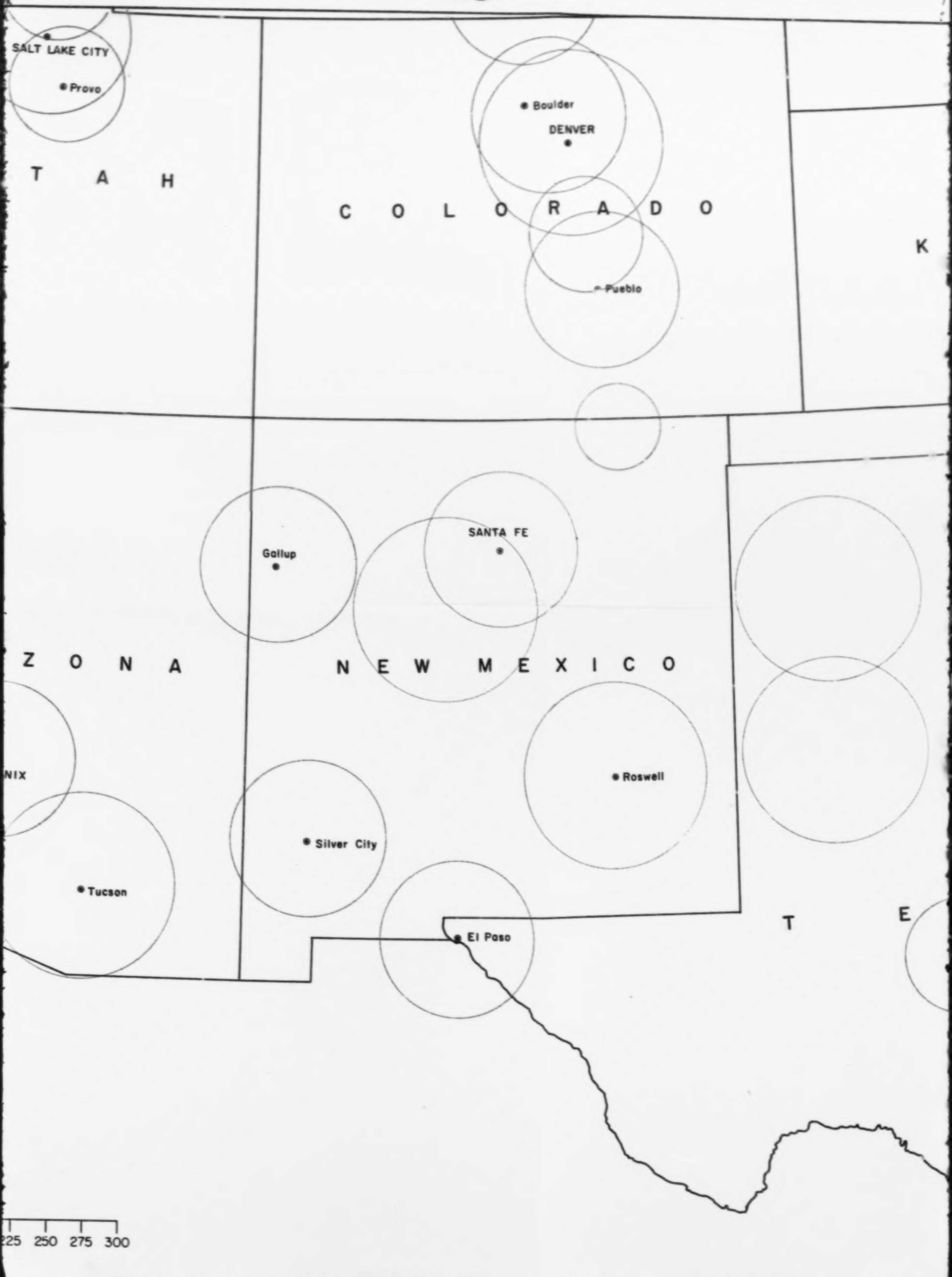
SALT LAKE CITY
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225 250 275 300

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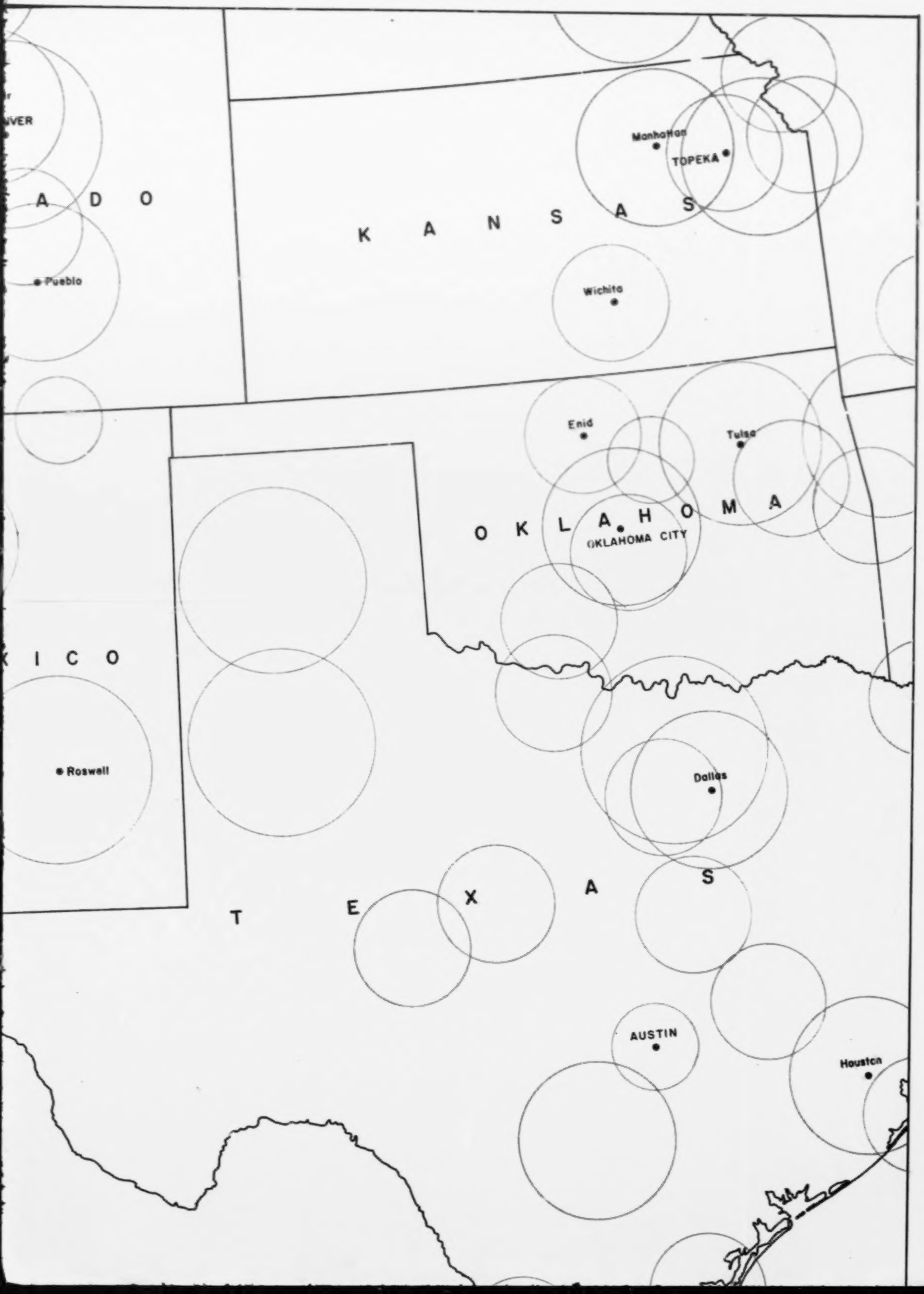
VER
Manhattan
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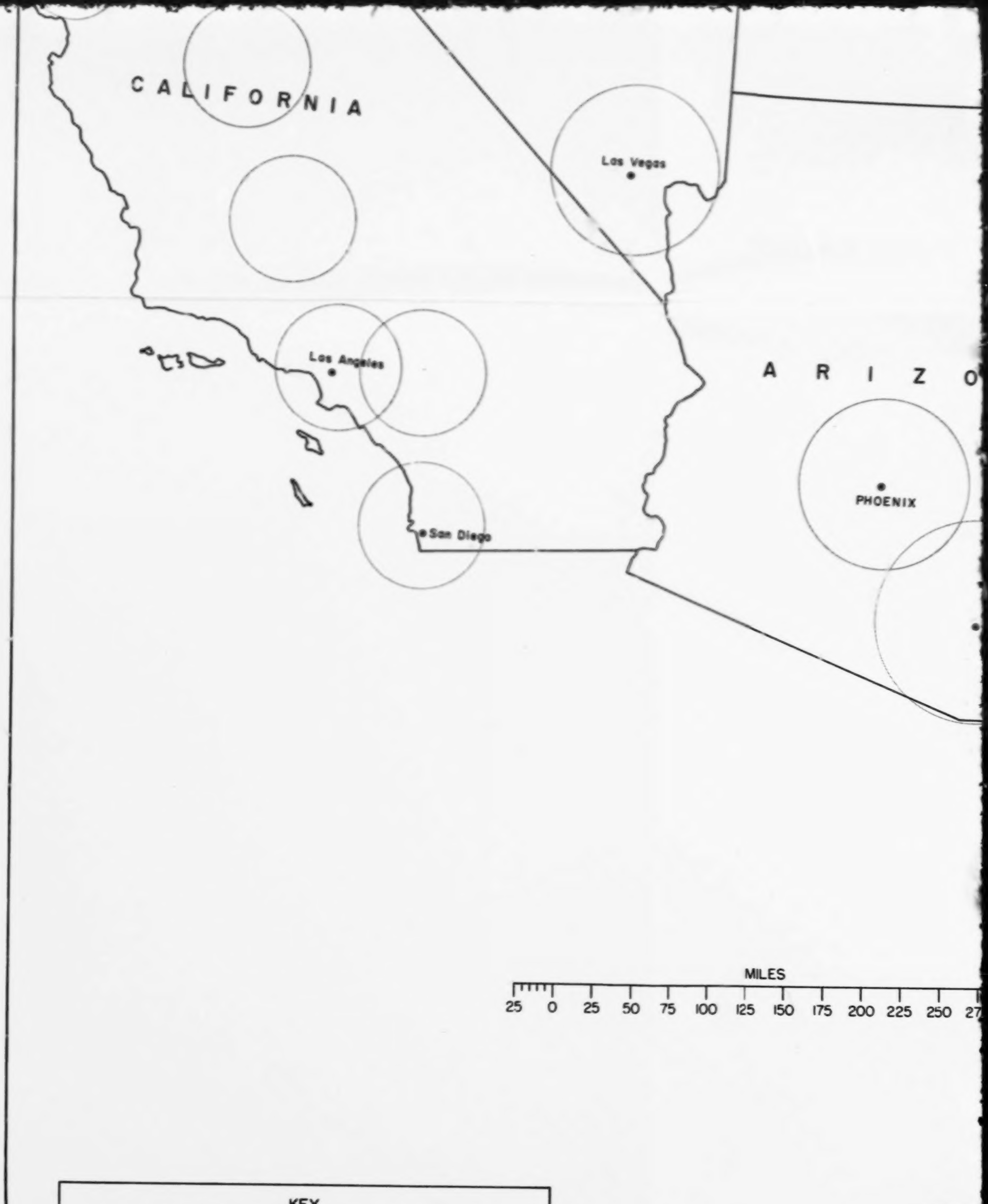
CALIFORNIA
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KEY
EXISTING EDUCATIONAL RESERVATIONS
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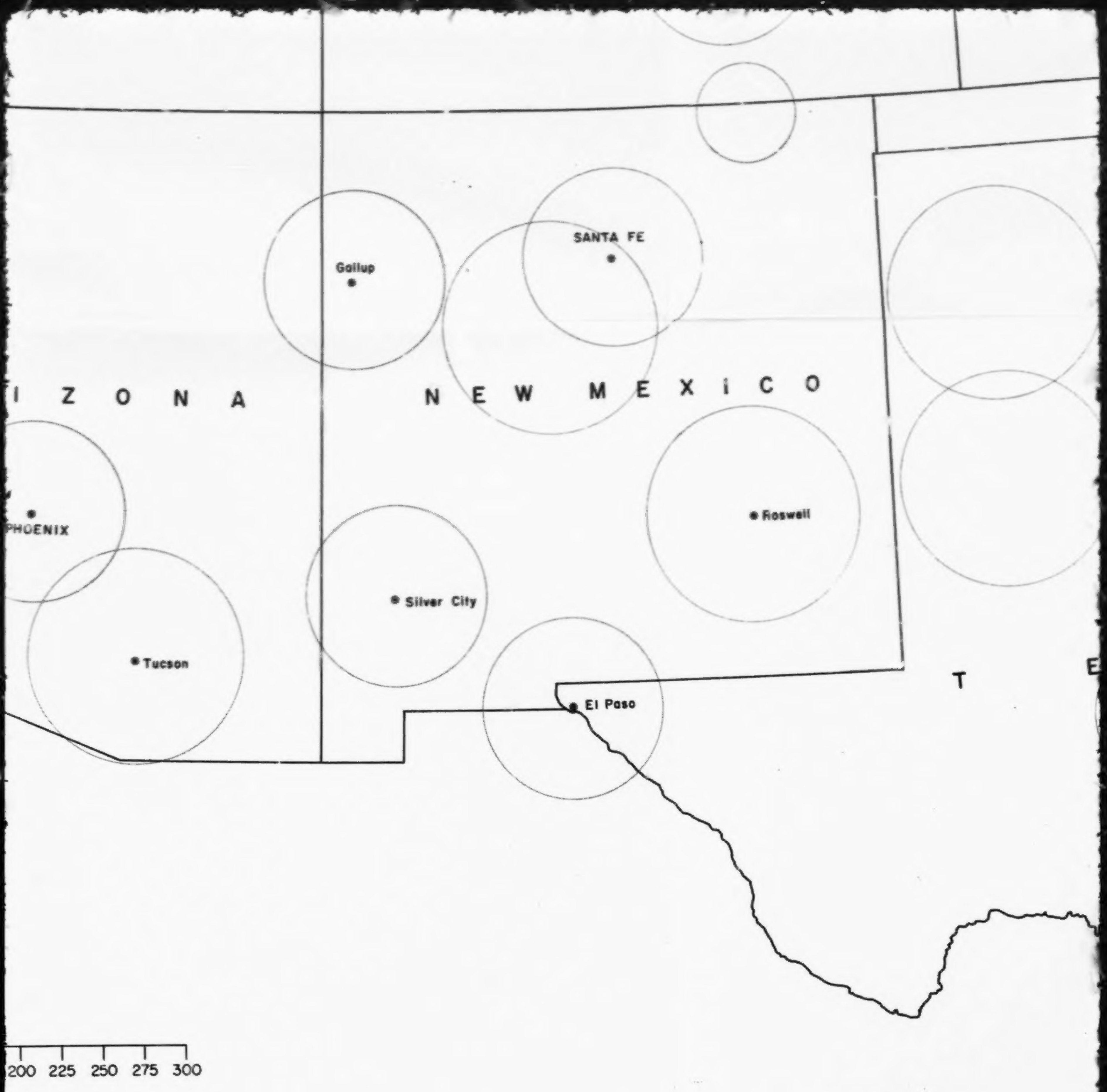
Gallup
SANTA FE
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200 225 250 275 300

FIG. 4
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER, 1961

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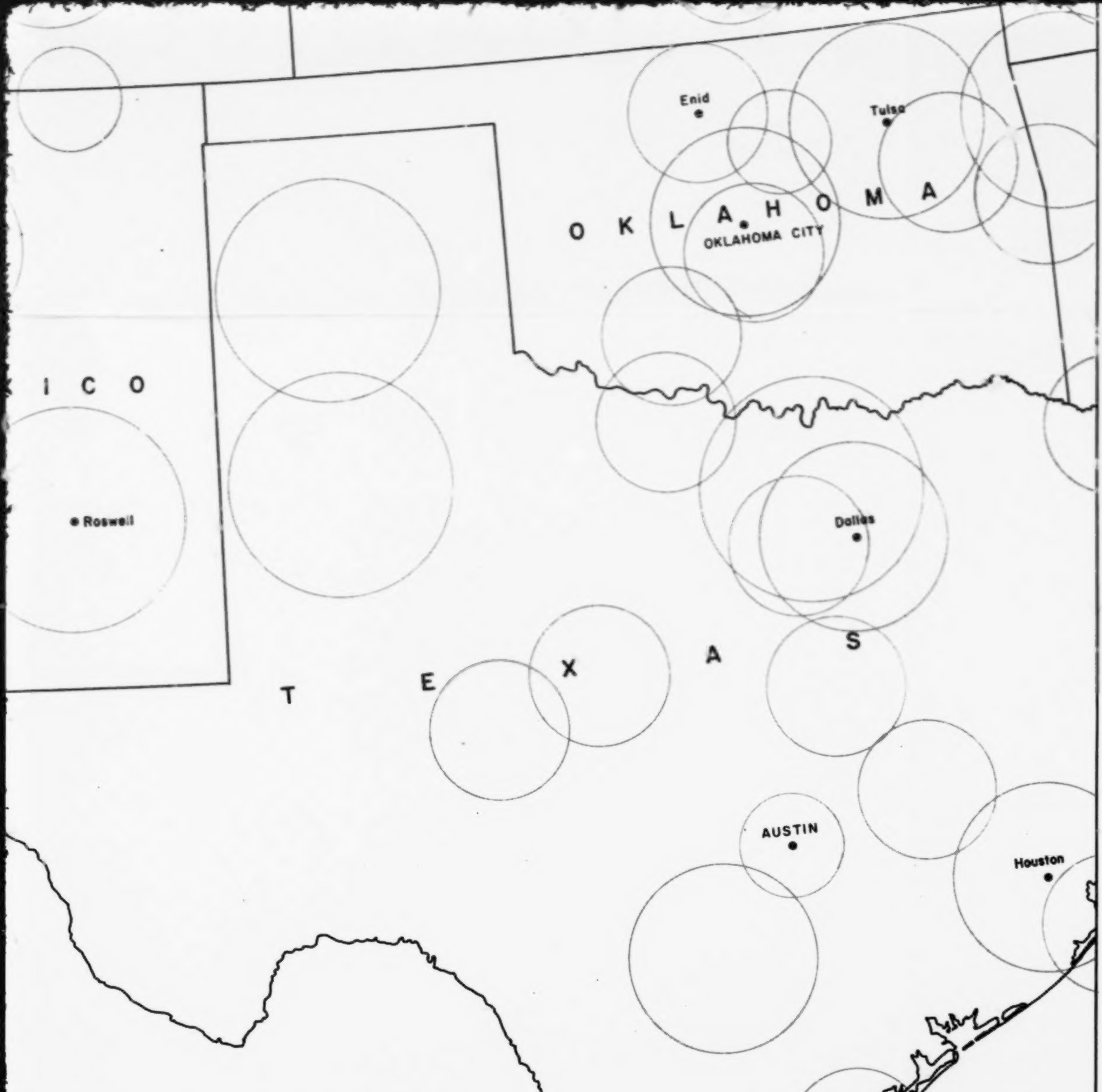
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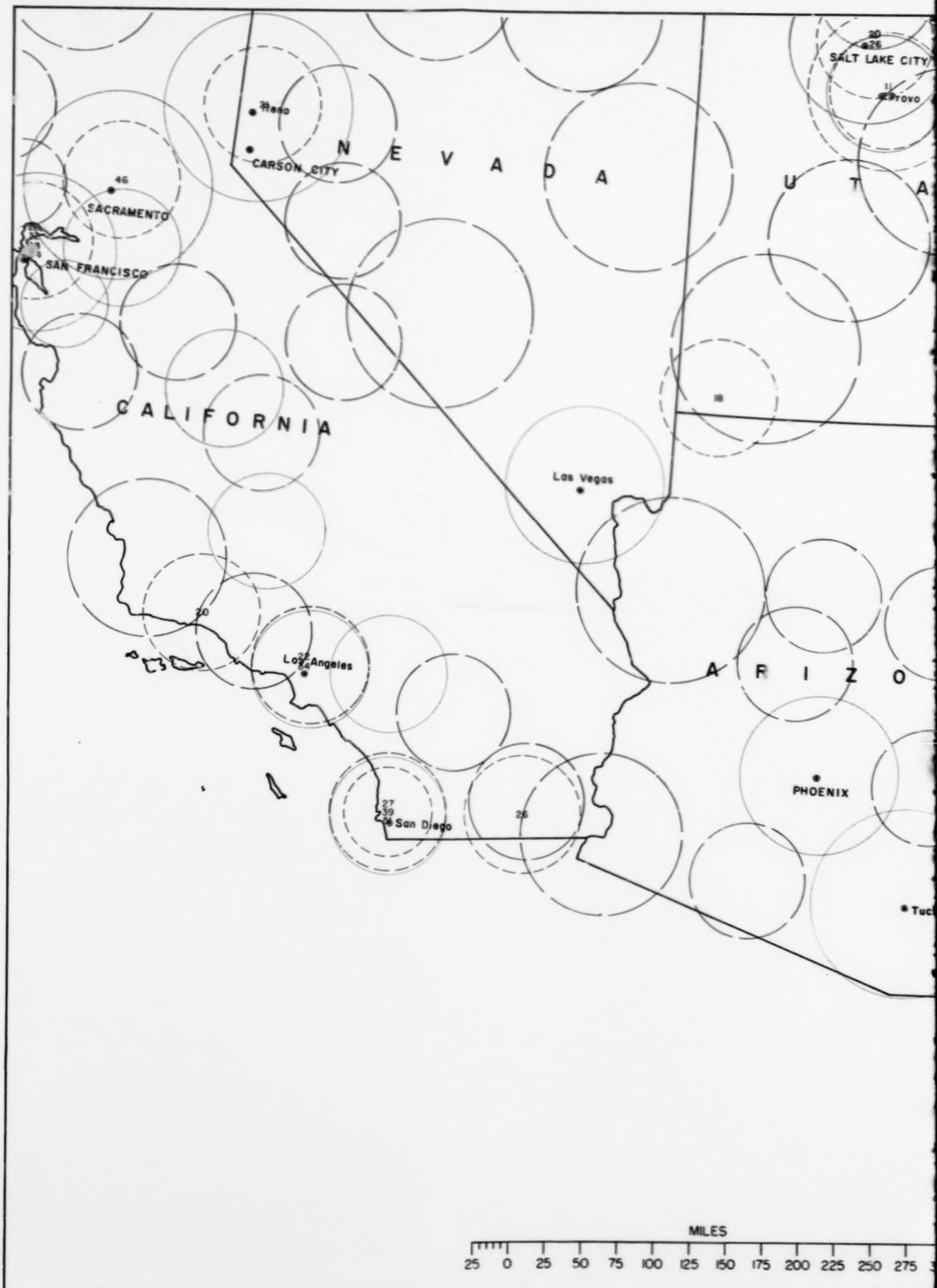
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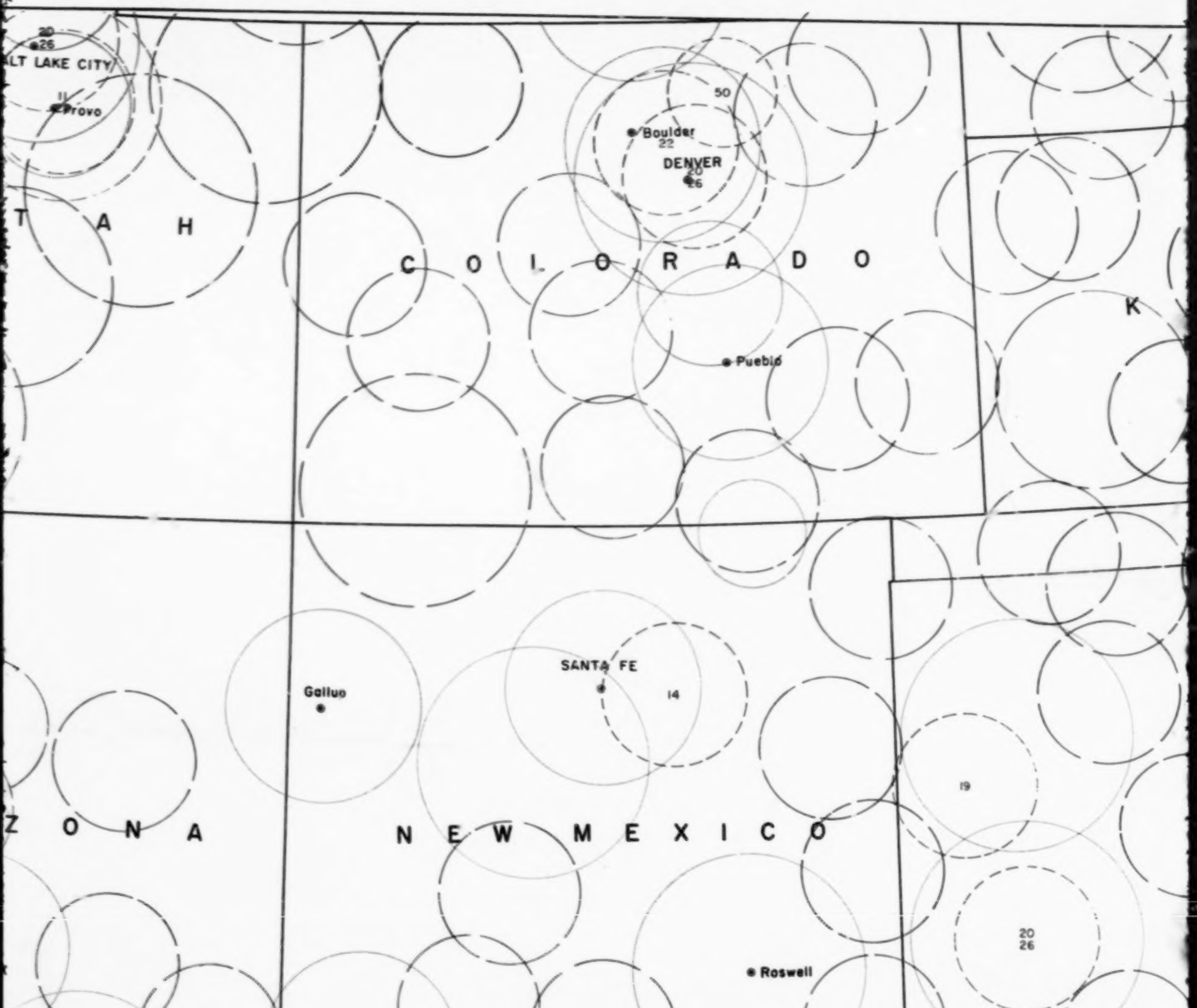
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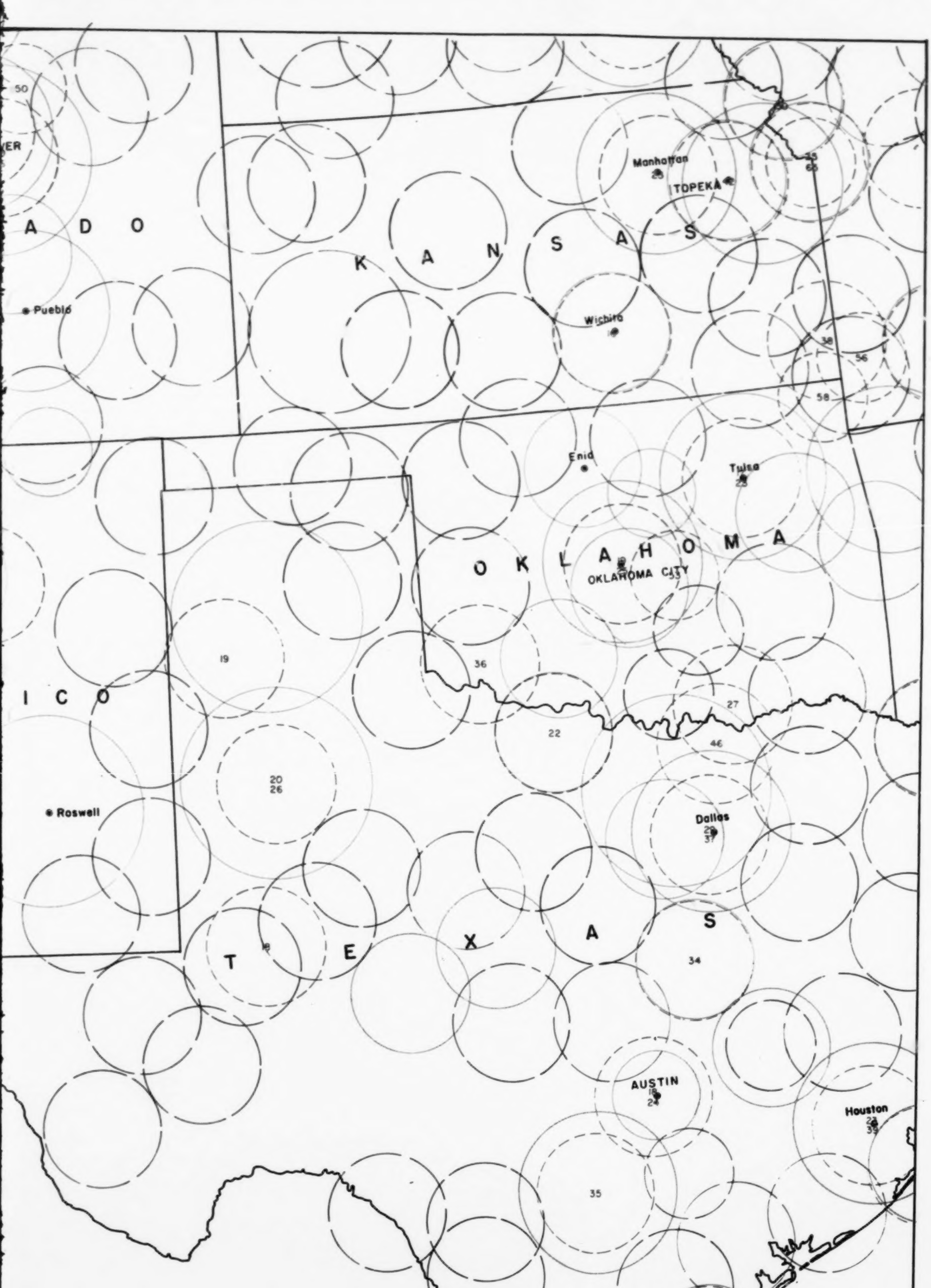
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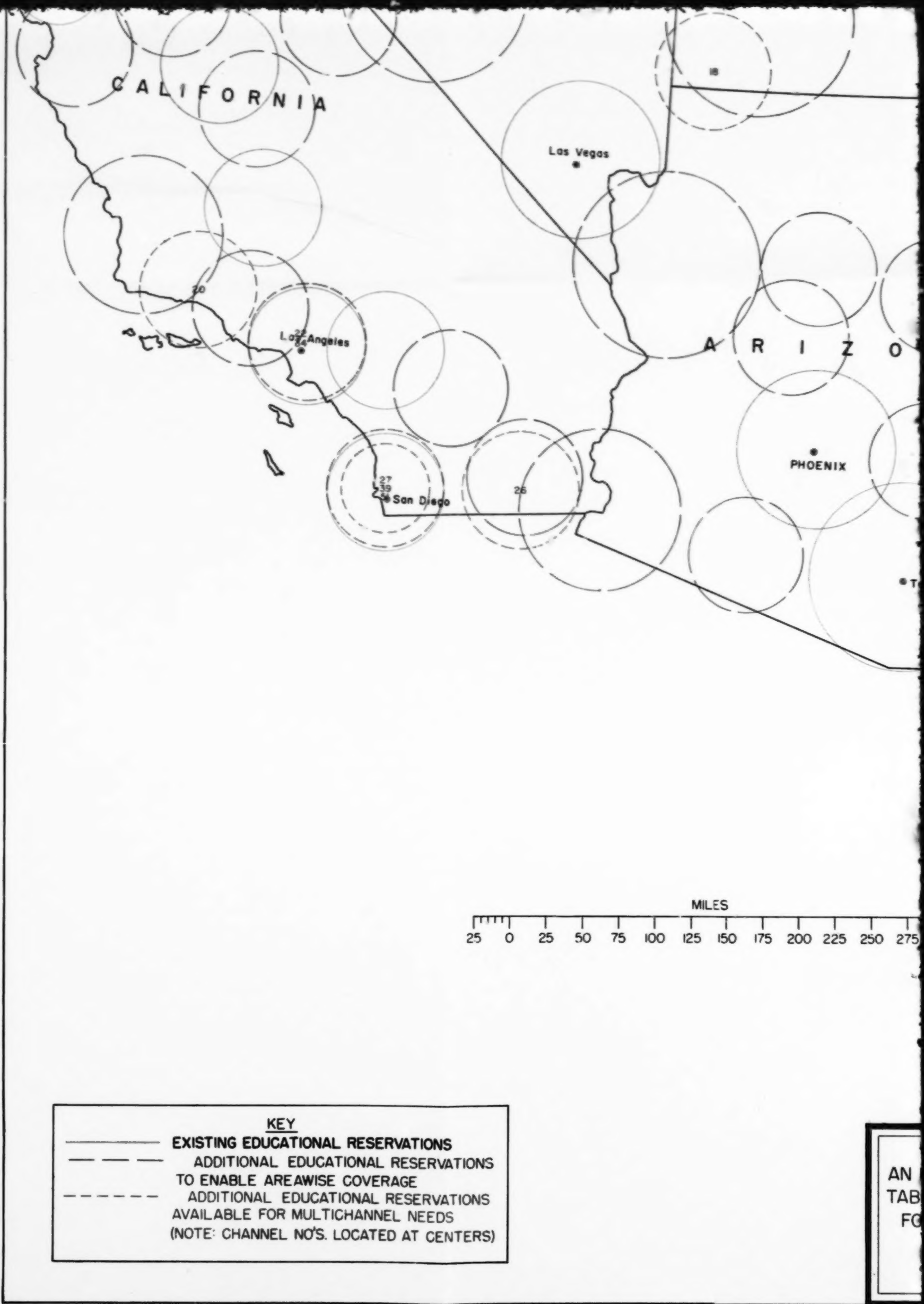
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Los Angeles
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PHOENIX
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KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS
(NOTE: CHANNEL NO'S. LOCATED AT CENTERS)
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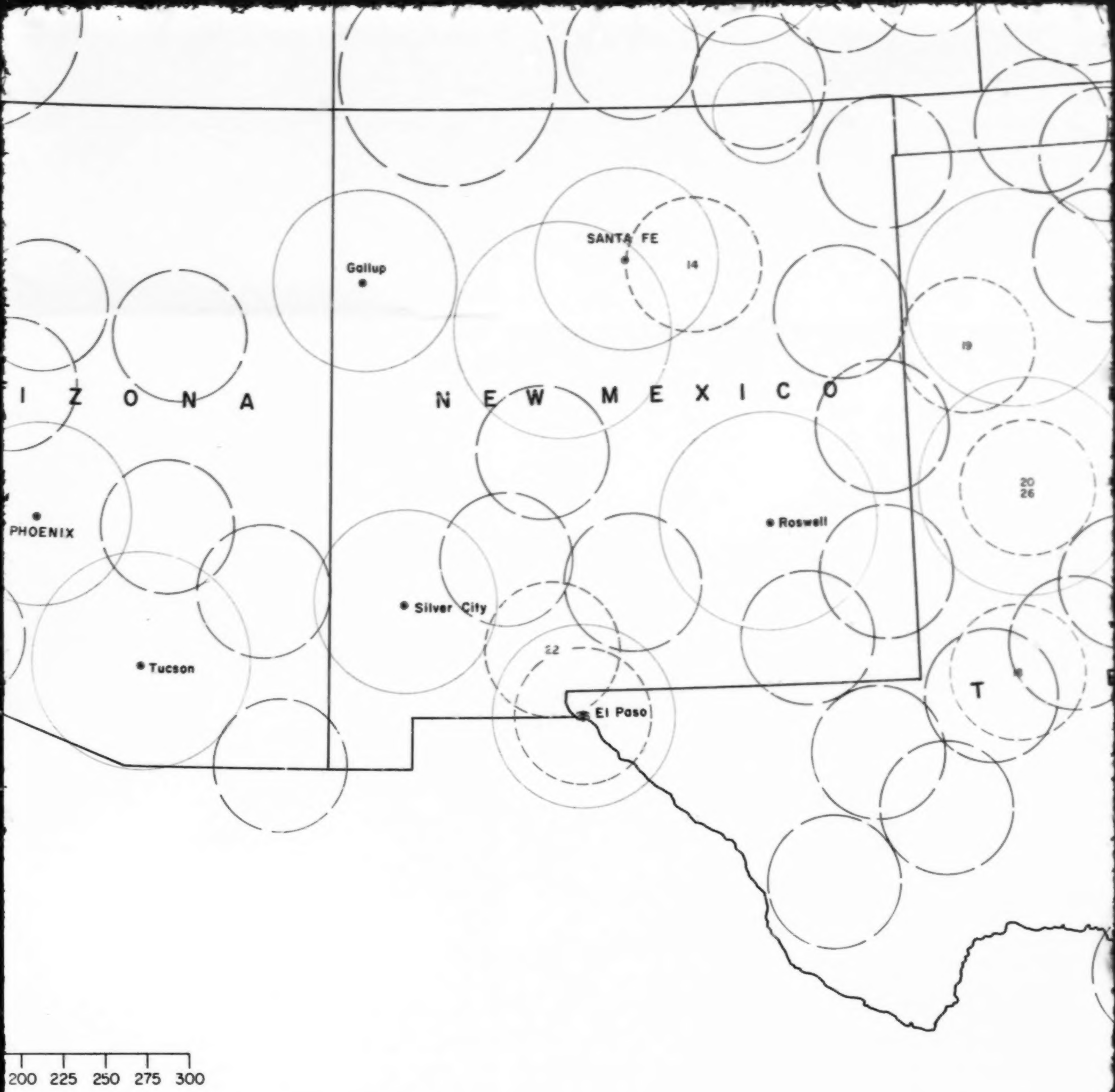
SANTA FE
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PHOENIX
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Silver City
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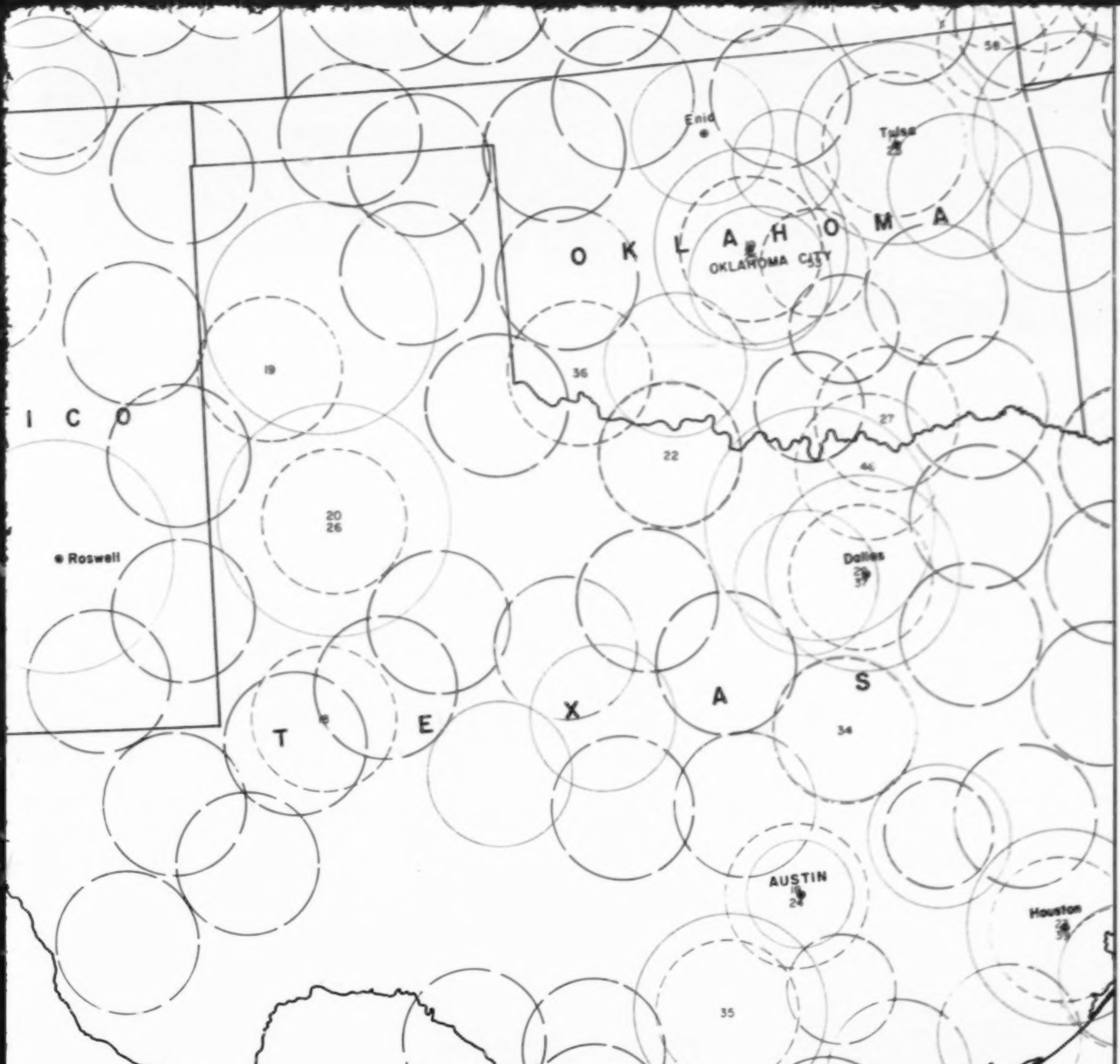
200 225 250 275 300

FIG. 4
AN EDUCATIONAL TELEVISION PLAN UTILIZING THE EXISTING TABLE OF ASSIGNMENTS AND SHOWING PROBABLE COVERAGE FOR THE SOUTH-WEST SECTOR OF THE UNITED STATES

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER, 1961


O K L A H O M A
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OKLAHOMA CITY
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Roswell
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AUSTIN
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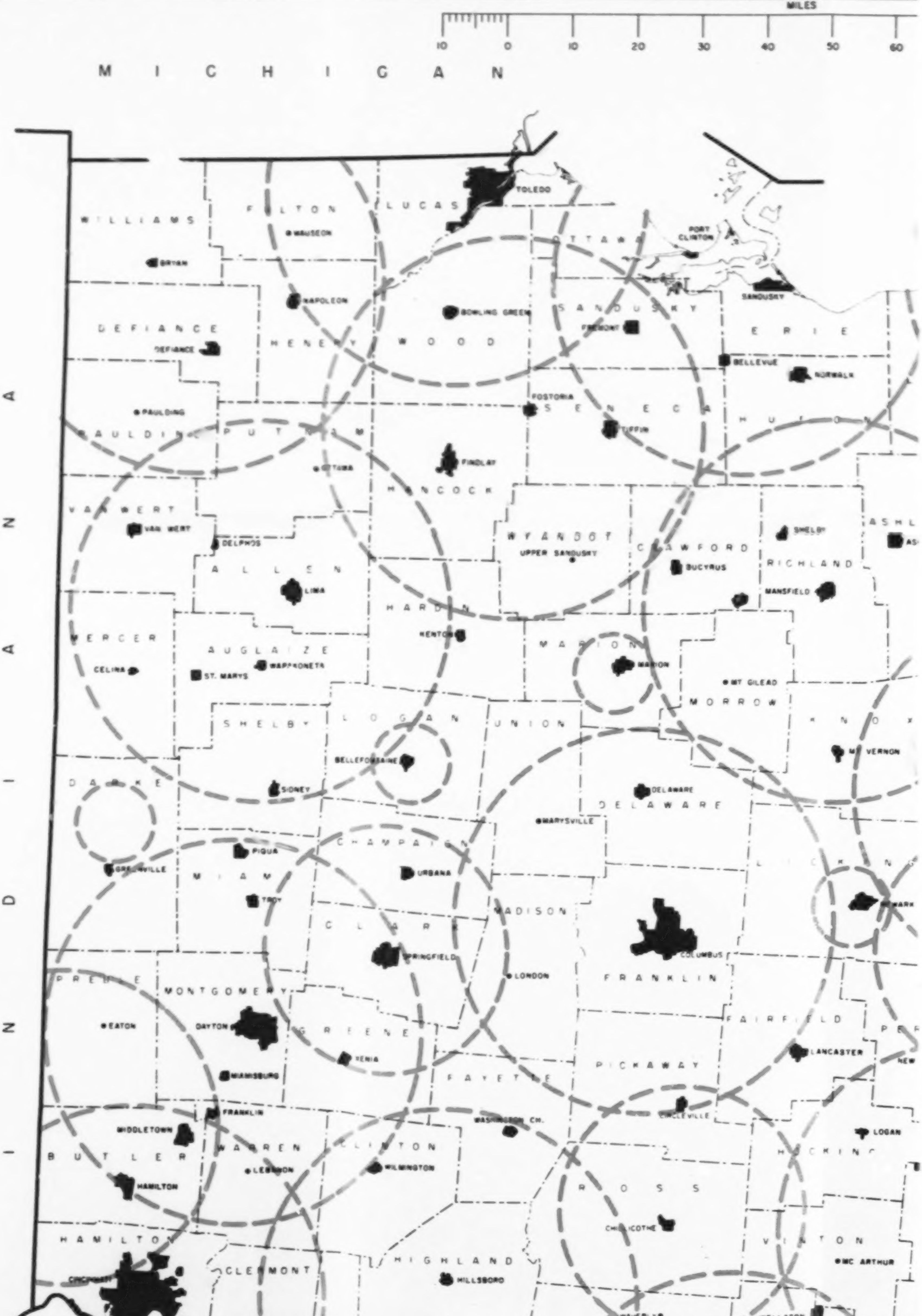
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INDIANA
WILLIAMS
BRYAN
FULTON
WAUSEON
LUCAS
TOLEDO
OTTAWA
PORT CLINTON
SANDUSKY
DEFIANCE
DEFIANCE
NAPOLEON
HENRY
BOWLING GREEN
WOOD
SANDUSKY
FREMONT
ERIE
BELLEVUE
NORWALK
PAULDING
PAULDING
PUTNAM
FOSTORIA
SENECA
TIFFIN
HURON
OTTAWA
FINDLAY
HANCOCK
VAN WERT
VAN WERT
DELPHOS
ALLEN
LIMA
WYANDOT
UPPER SANDUSKY
CRAWFORD
BUCYRUS
SHELBY
RICHLAND
MANSFIELD
ASHL
MERCER
CELINA
AUGLAIZE
ST. MARYS
WAPAKONETA
HARDIN
KENTON
MARION
MARION
MT GILEAD
MORROW
SHELBY
LOGAN
BELLEFONTAINE
UNION
KNOX
MT VERNON
DARKE
SIDNEY
DELAWARE
DELAWARE
MARYSVILLE
PIQUA
GREENVILLE
MIAMI
TROY
CHAMPAIGN
URBANA
LICKING
NEWARK
CLARK
SPRINGFIELD
MADISON
LONDON
COLUMBUS
FRANKLIN
PREBLE
EATON
MONTGOMERY
DAYTON
GREENE
XENIA
MIAMISBURG
FAIRFIELD
LANCASTER
PERRY
NEW
FAYETTE
PICKAWAY
CIRCLEVILLE
FRANKLIN
MIDDLETOWN
BUTLER
HAMILTON
WARREN
LEBANON
CLINTON
WILMINGTON
WASHINGTON CH.
HOCKING
LOGAN
ROSS
CHILLICOTHE
VINTON
MC ARTHUR
HAMILTON
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CLERMONT
HIGHLAND
HILLSBORO
WAVERLY
WELLSTON

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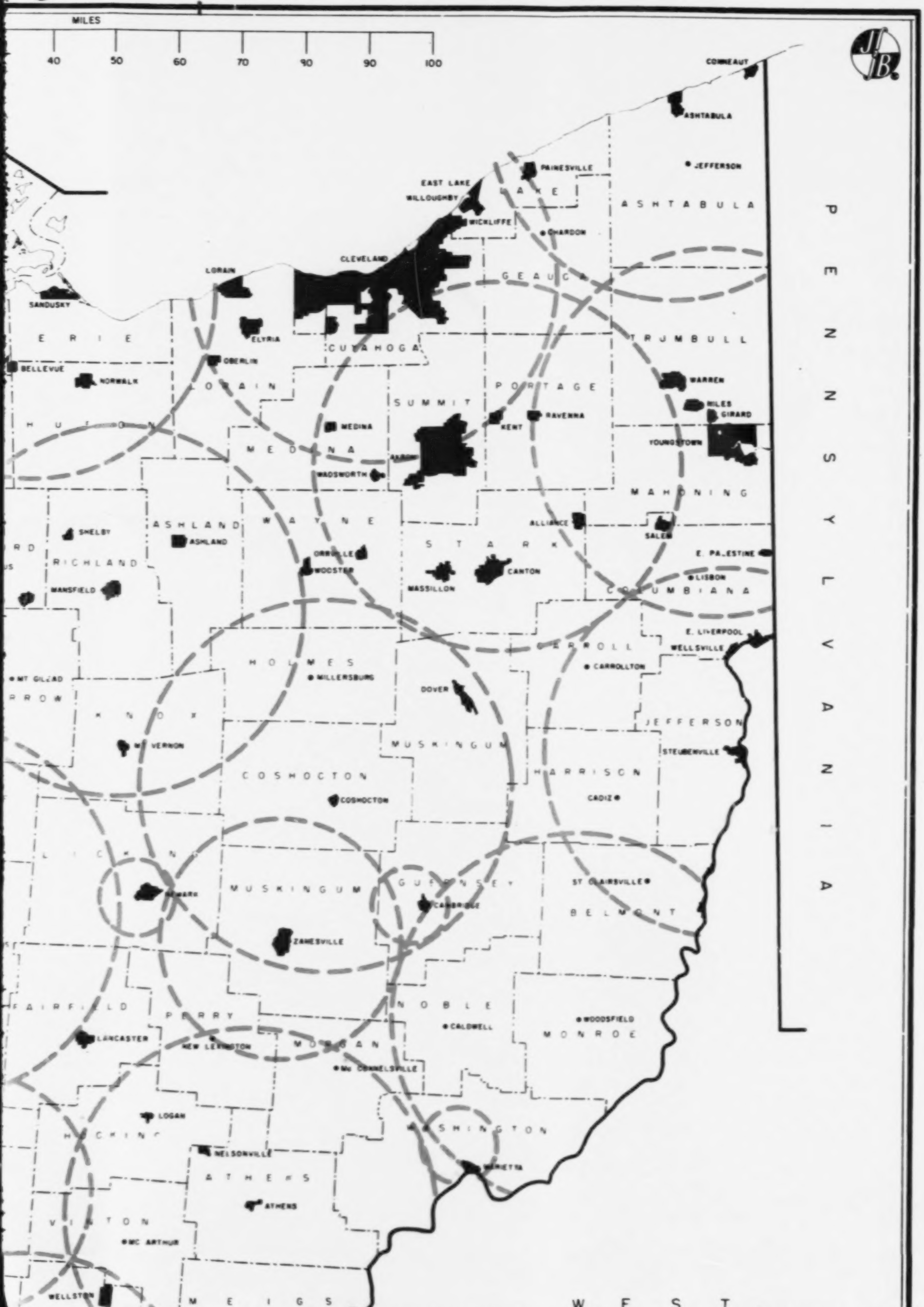
Sec II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ASHTABULA
JEFFERSON
ASHTABULA
PAINESVILLE
EAST LAKE
WILLOUGHBY
LAKE
WICKLIFFE
CHARDON
CLEVELAND
LORAIN
SANDUSKY
GEAUGA
ERIE
ELYRIA
CUYAHOGA
TRUMBULL
OBERLIN
BELLEVUE
NORWALK
LORAIN
PORTAGE
SUMMIT
WARREN
NILES
GIRARD
RAVENNA
KENT
MEDINA
HURON
MEDINA
AKRON
YOUNGSTOWN
WADSWORTH
MAHONING
ALLIANCE
SALEM
ASHLAND
WAYNE
SHELBY
ASHLAND
STARK
E. PALESTINE
ORRVILLE
WOOSTER
RICHLAND
CANTON
LISBON
MASSILLON
MANSFIELD
COLUMBIANA
E. LIVERPOOL
CARROLL
WELLSVILLE
CARROLLTON
HOLMES
MILLERSBURG
MT GILEAD
DOVER
KNOX
JEFFERSON
MUSKINGUM
STEUBENVILLE
MT VERNON
HARRISON
COSHOCTON
CADIZ
COSHOCTON
LICKING
GUERNSEY
ST CLAIRSVILLE
NEWARK
MUSKINGUM
CAMBRIDGE
BELMONT
ZANESVILLE
NOBLE
FAIRFIELD
PERRY
WOODSFIELD
CALDWELL
MONROE
LANCASTER
NEW LEXINGTON
MORGAN
MC CONNELSVILLE
LOGAN
WASHINGTON
HOCKING
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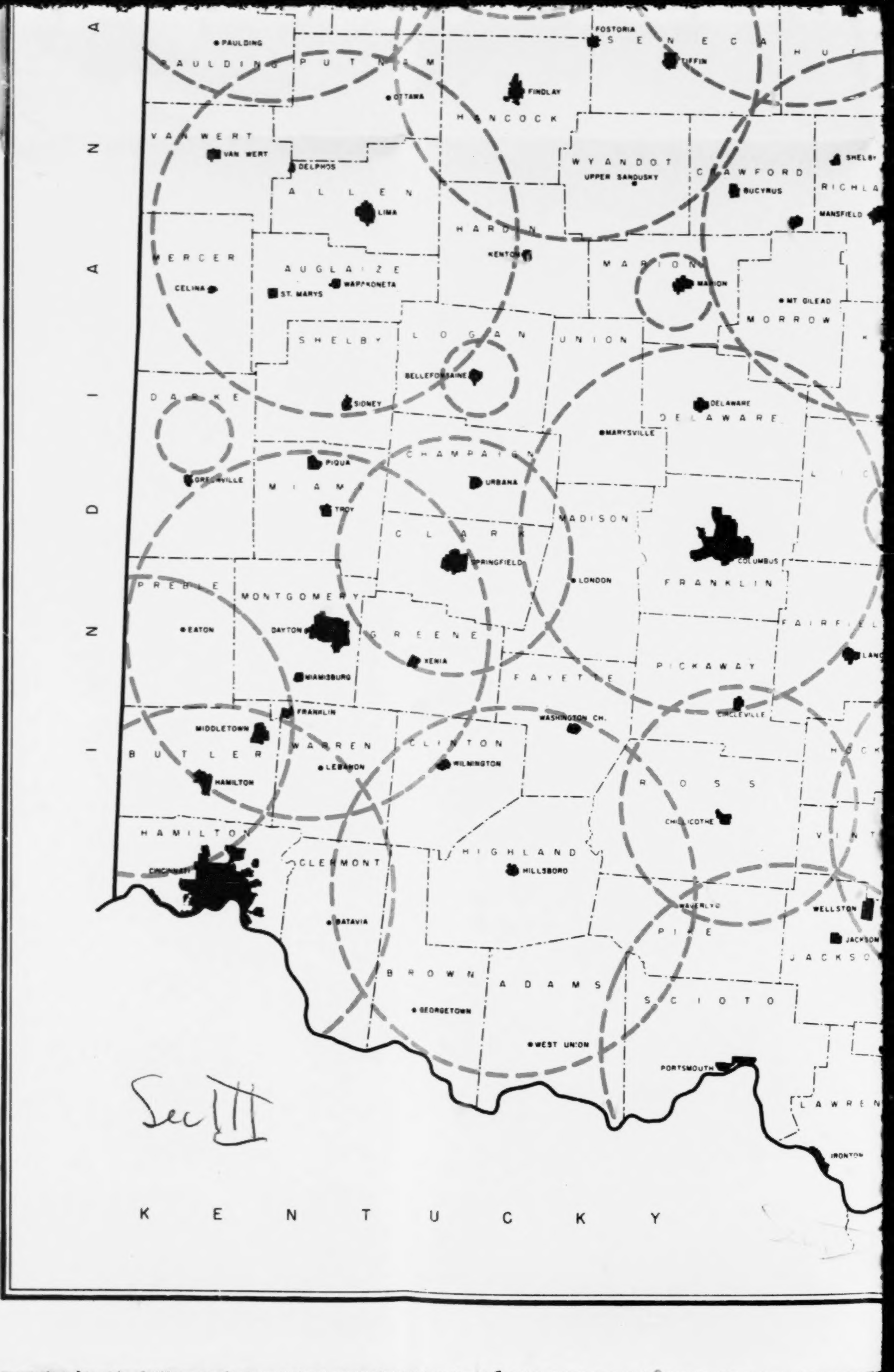
WELLSTON
MEIGS
WEST
PENNSYLVANIA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KENTUCKY
PAULDING
PAULDING
PUTNAM
OTTAWA
FINDLAY
HANCOCK
FOSTORIA
SENECA
TIFFIN
HU
VAN WERT
VAN WERT
DELPHOS
ALLEN
LIMA
WYANDOT
UPPER SANDUSKY
CRAWFORD
BUCYRUS
SHELBY
RICHLA
MANSFIELD
HARDIN
KENTON
MERCER
CELINA
AUGLAIZE
WAPAKONETA
ST. MARYS
MARION
MARION
MT GILEAD
MORROW
SHELBY
LOGAN
UNION
BELLEFONTAINE
SIDNEY
DARKE
DELAWARE
DELAWARE
MARYSVILLE
GREENVILLE
PIQUA
MIAMI
TROY
CHAMPAIGN
URBANA
MADISON
CLARK
SPRINGFIELD
COLUMBUS
LONDON
FRANKLIN
PREBLE
MONTGOMERY
EATON
DAYTON
GREENE
XENIA
MIAMISBURG
FAYETTE
PICKAWAY
FAIRFIEL
LANC
FRANKLIN
MIDDLETOWN
WASHINGTON CH.
CIRCLEVILLE
BUTLER
WARREN
LEBANON
CLINTON
WILMINGTON
HAMILTON
ROSS
HOCK
CHILLICOTHE
HAMILTON
CINCINNATI
CLERMONT
HIGHLAND
HILLSBORO
VINT
WAVERLY
PIKE
WELLSTON
JACKSON
JACKSO
BATAVIA
BROWN
ADAMS
SCIOTO
GEORGETOWN
WEST UNION
PORTSMOUTH
LAWREN
IRONTON

Sec III

641712 O - 62 (Follows Text) No. 1

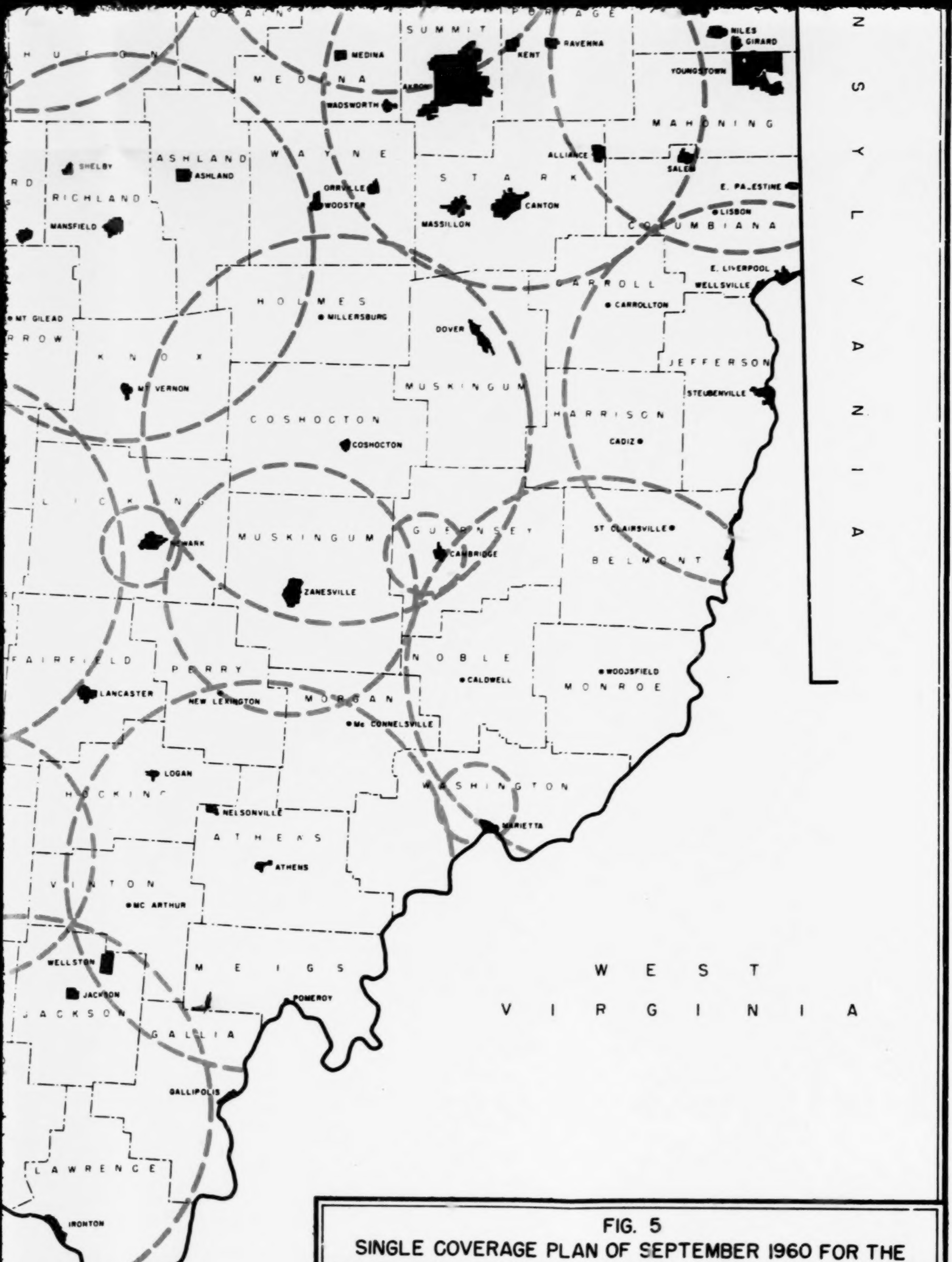
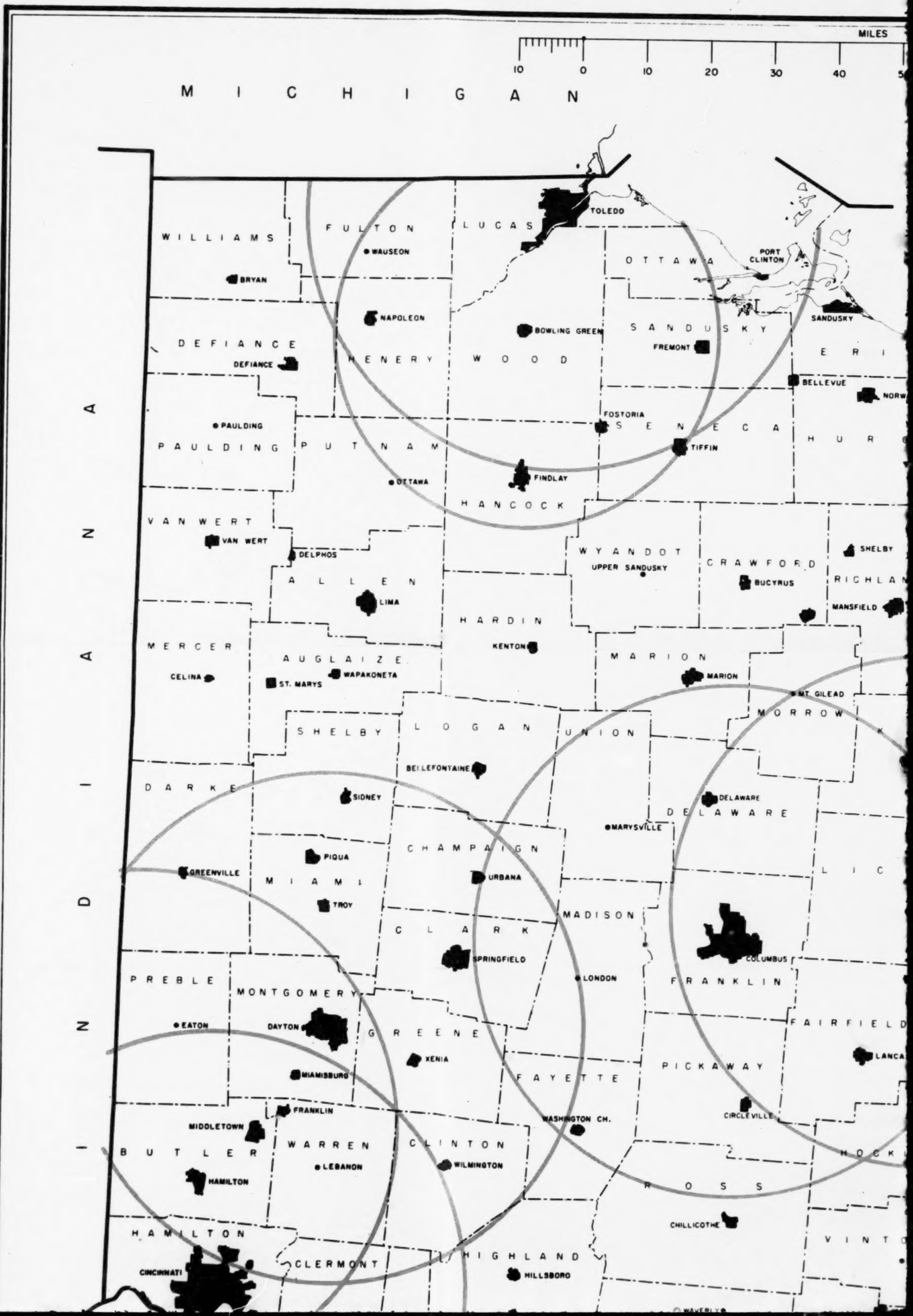

LORAIN
PORTAGE
SUMMIT
HURON
MEDINA
NILES
GIRARD
RAVENNA
KENT
AKRON
YOUNGSTOWN
WADSWORTH
MAHONING
ASHLAND
WAYNE
ALLIANCE
SALEM
SHELBY
STARK
RICHLAND
ORRVILLE
WOOSTER
E. PALESTINE
LISBON
MANSFIELD
MASSILLON
CANTON
COLUMBIANA
E. LIVERPOOL
WELLSVILLE
CARROLL
CARROLLTON
HOLMES
MILLERSBURG
MT GILEAD
MORROW
DOVER
KNOX
JEFFERSON
MT VERNON
TUSCARAWAS
STEUBENVILLE
HARRISON
COSHOCTON
CADIZ
LICKING
MUSKINGUM
GUERNSEY
ST CLAIRSVILLE
BELMONT
NEWARK
CAMBRIDGE
ZANESVILLE
FAIRFIELD
PERRY
NOBLE
WOODSFIELD
CALDWELL
MONROE
LANCASTER
NEW LEXINGTON
MORGAN
Mc CONNELSVILLE
WASHINGTON
LOGAN
HOCKING
NELSONVILLE
MARIETTA
ATHENS
VINTON
MC ARTHUR
WELLSTON
MEIGS
JACKSON
POMEROY
GALLIA
GALLIPOLIS
LAWRENCE
IRONTON
PENNSYLVANIA
WEST VIRGINIA

FIG. 5

SINGLE COVERAGE PLAN OF SEPTEMBER 1960 FOR THE OHIO INTERIM EDUCATIONAL TELEVISION STUDY COMMISSION

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961

Sec. IV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INDIANA
WILLIAMS
BRYAN
FULTON
WAUSEON
LUCAS
TOLEDO
OTTAWA
PORT CLINTON
SANDUSKY
DEFIANCE
DEFIANCE
HENERY
NAPOLEON
WOOD
BOWLING GREEN
SANDUSKY
FREMONT
BELLEVUE
PAULDING
PAULDING
PUTNAM
OTTAWA
FOSTORIA
SENECA
TIFFIN
HANCOCK
FINDLAY
VAN WERT
VAN WERT
DELPHOS
ALLEN
LIMA
WYANDOT
UPPER SANDUSKY
CRAWFORD
BUCYRUS
SHELBY
MANSFIELD
HARDIN
KENTON
MERCER
CELINA
AUGLAIZE
WAPAKONETA
ST. MARYS
MARION
MARION
MT. GILEAD
MORROW
SHELBY
LOGAN
BELLEFONTAINE
UNION
DARKE
SIDNEY
DELAWARE
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MARYSVILLE
CHAMPAIGN
URBANA
PIQUA
MIAMI
TROY
GREENVILLE
MADISON
CLARK
SPRINGFIELD
LONDON
COLUMBUS
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EATON
MONTGOMERY
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MIAMISBURG
FAYETTE
PICKAWAY
CIRCLEVILLE
FAIRFIELD
WASHINGTON CH.
FRANKLIN
MIDDLETOWN
BUTLER
HAMILTON
WARREN
LEBANON
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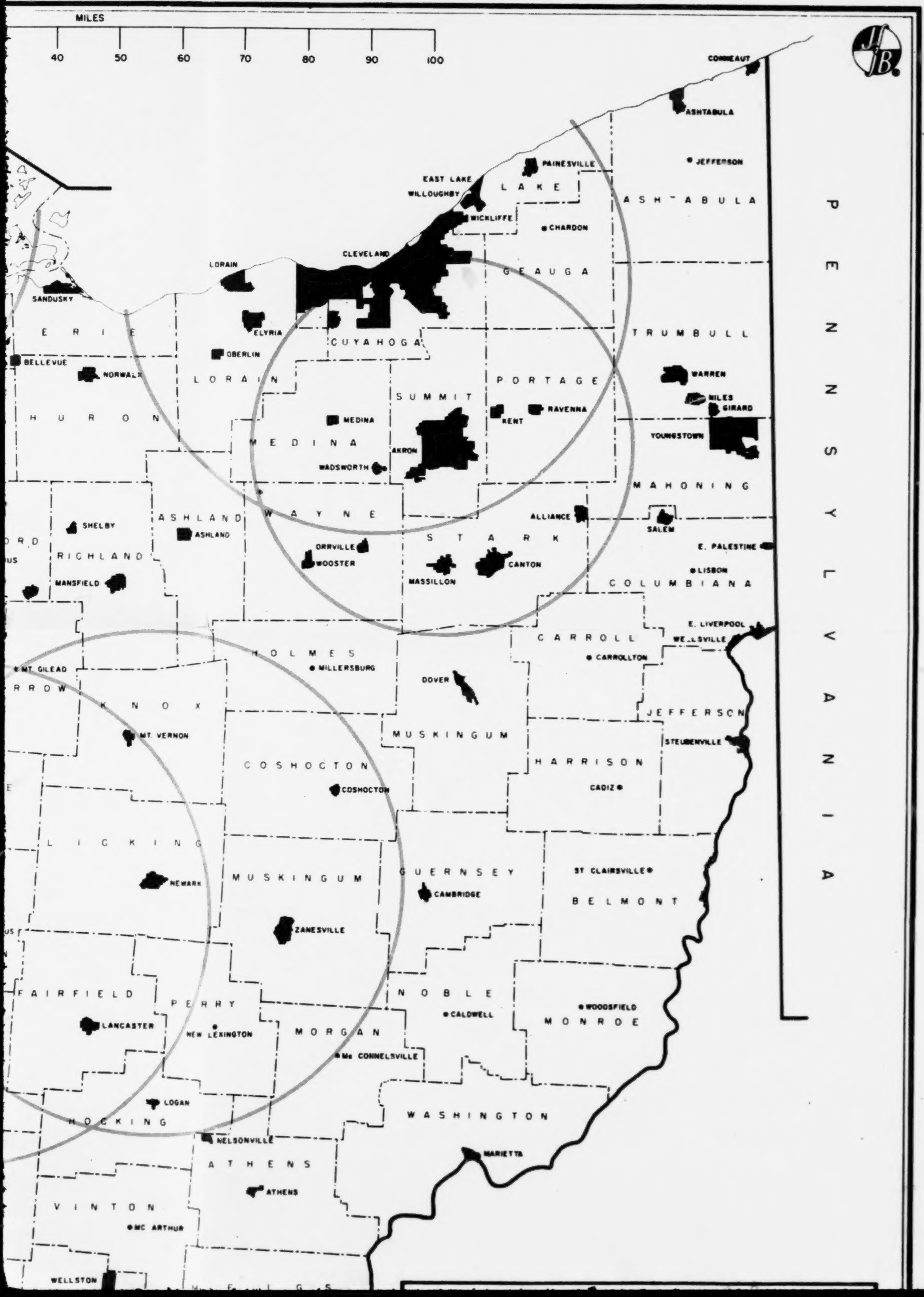
CLERMONT
HIGHLAND
HILLSBORO
WAVERLY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WILLOUGHBY
LAKE
WICKLIFFE
CHARDON
CLEVELAND
GEAUGA
LORAIN
SANDUSKY
ELYRIA
ERIE
CUYAHOGA
TRUMBULL
BELLEVUE
OBERLIN
NORWALK
LORAIN
PORTAGE
WARREN
SUMMIT
NILES
GIRARD
HURON
MEDINA
KENT
RAVENNA
YOUNGSTOWN
MEDINA
AKRON
WADSWORTH
MAHONING
ASHLAND
WAYNE
ALLIANCE
SALEM
SHELBY
ASHLAND
STARK
ORD
RICHLAND
ORRVILLE
E. PALESTINE
US
WOOSTER
CANTON
MANSFIELD
MASSILLON
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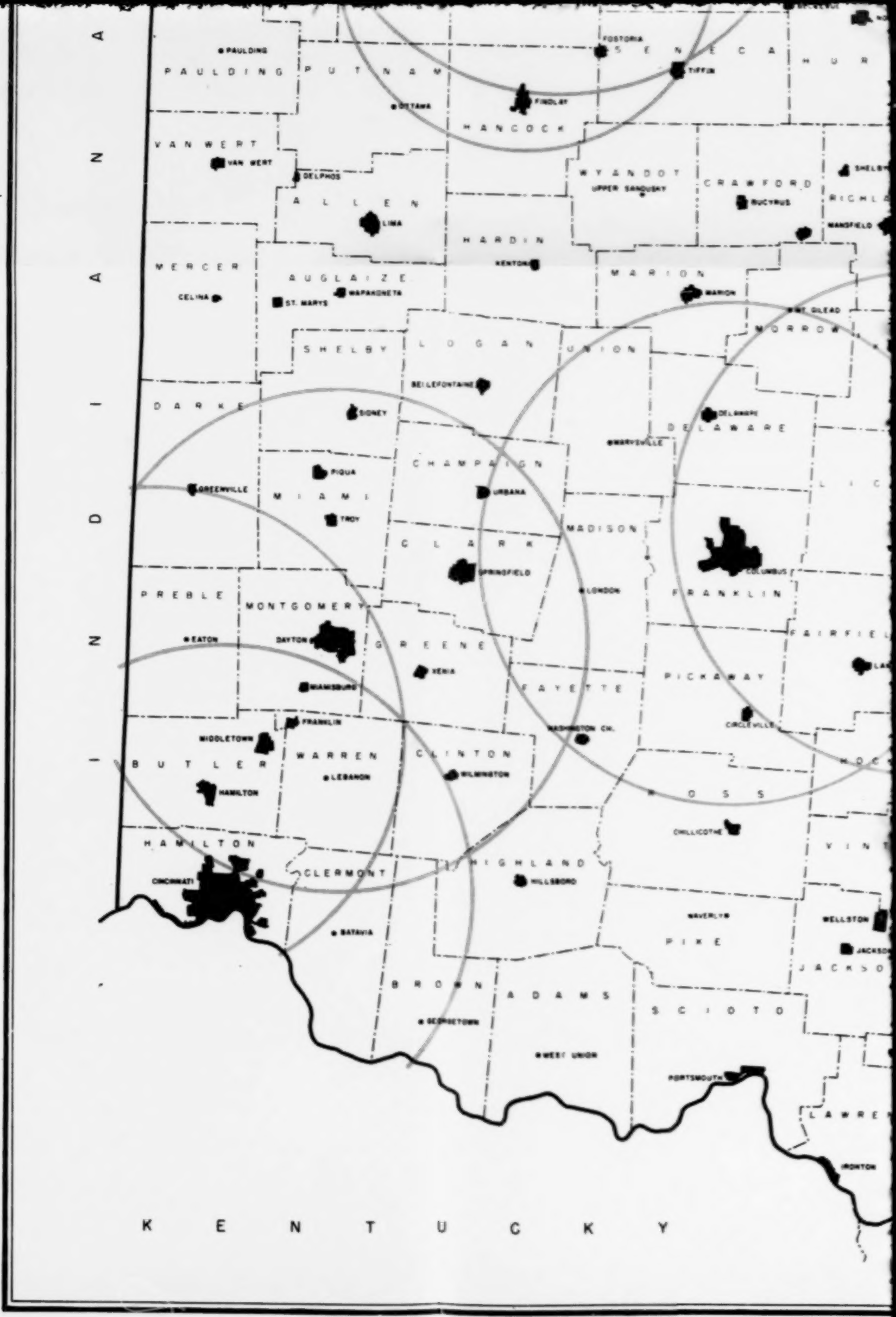
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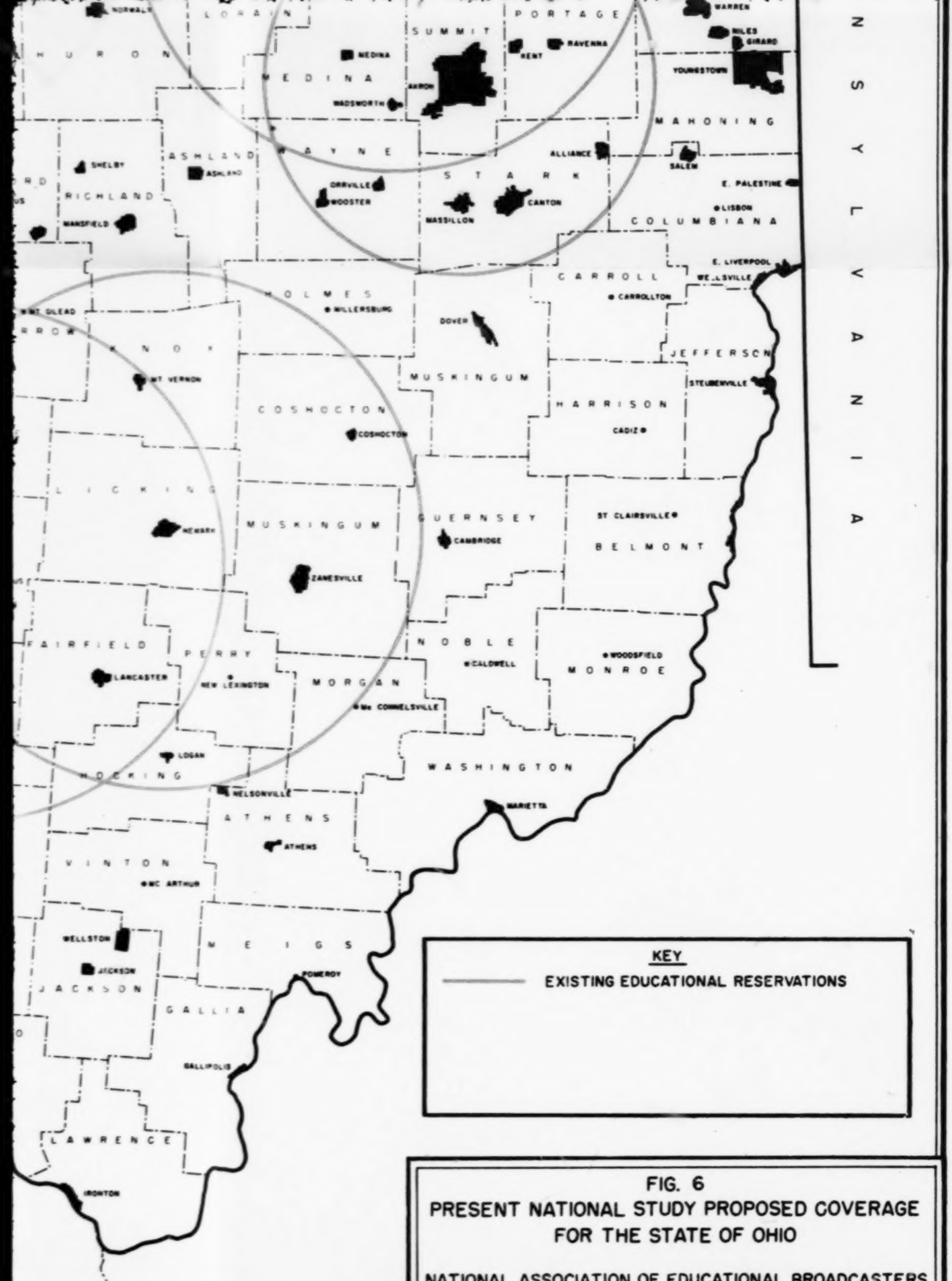
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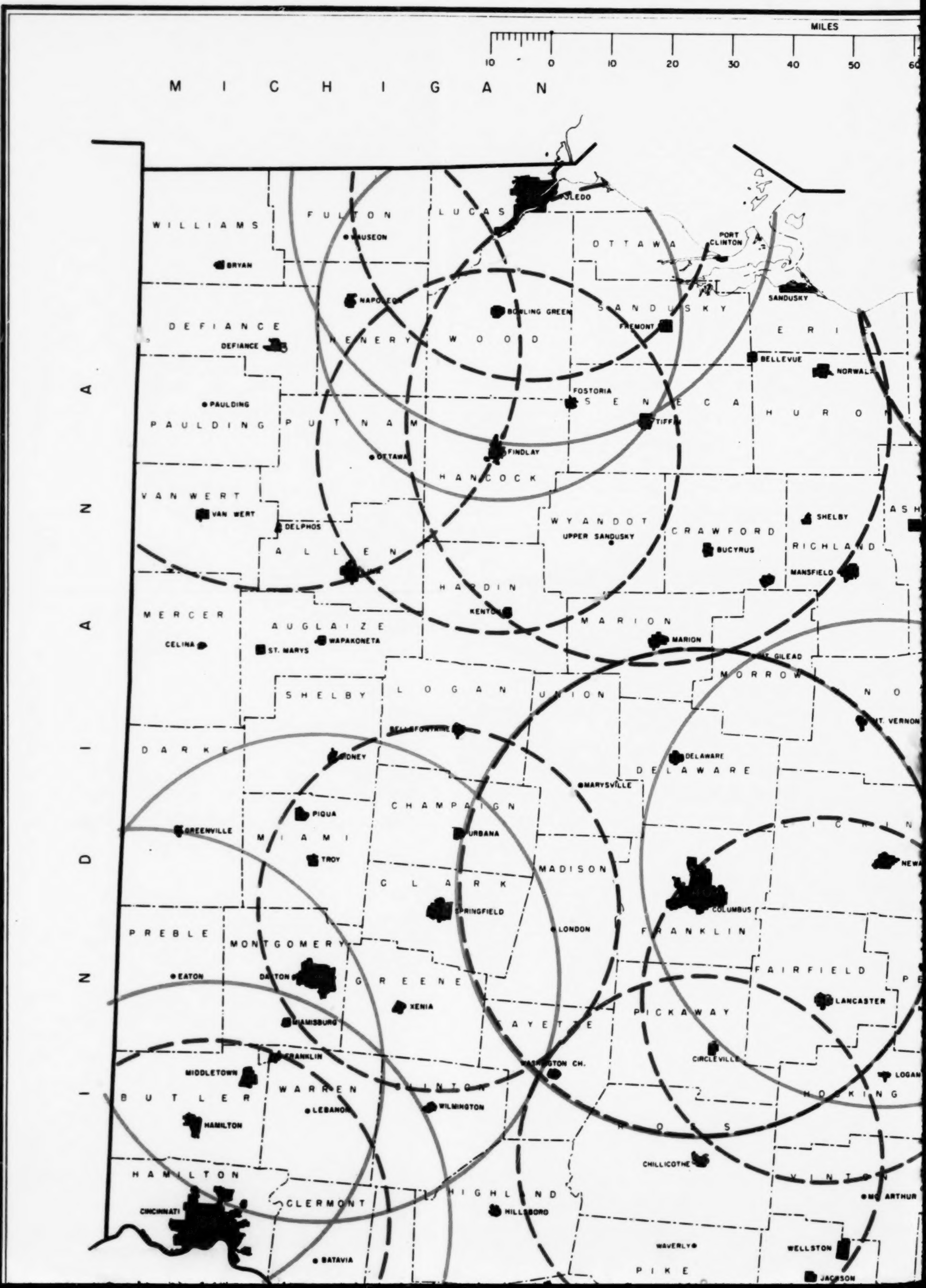
IRONTON
PENNSYLVANIA
KEY
EXISTING EDUCATIONAL RESERVATIONS

FIG. 6
PRESENT NATIONAL STUDY PROPOSED COVERAGE FOR THE STATE OF OHIO

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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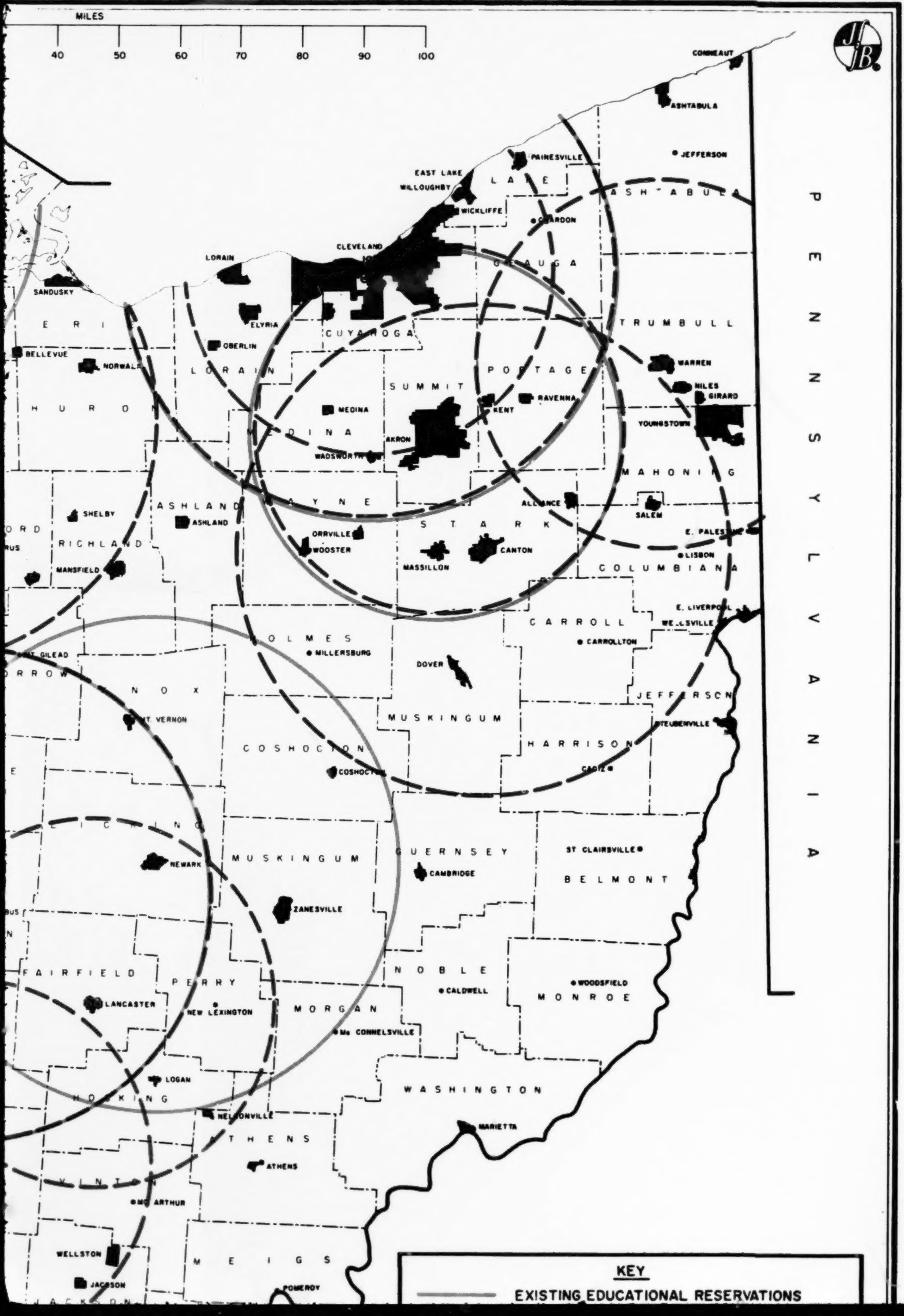
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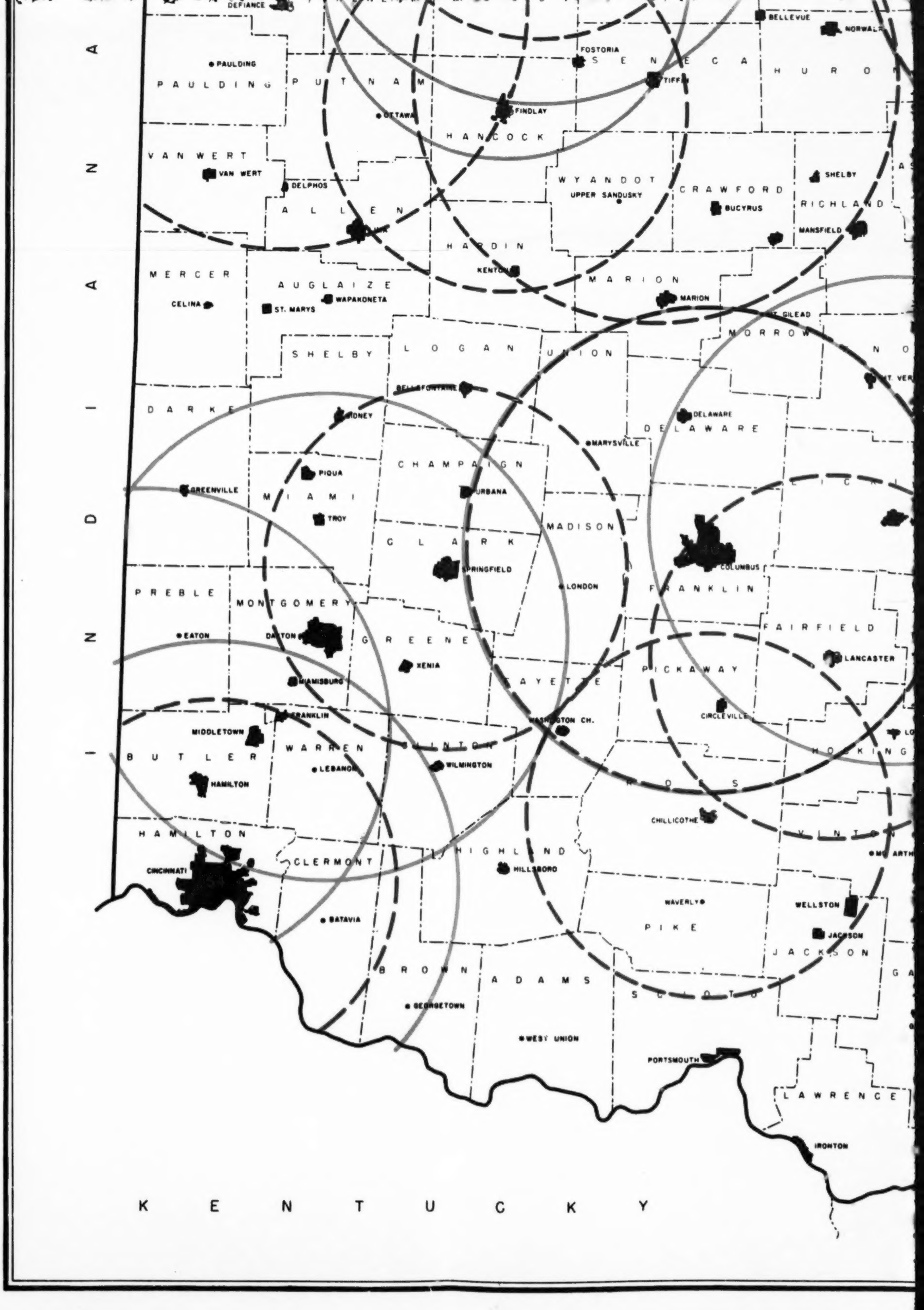
KEY
EXISTING EDUCATIONAL RESERVATIONS



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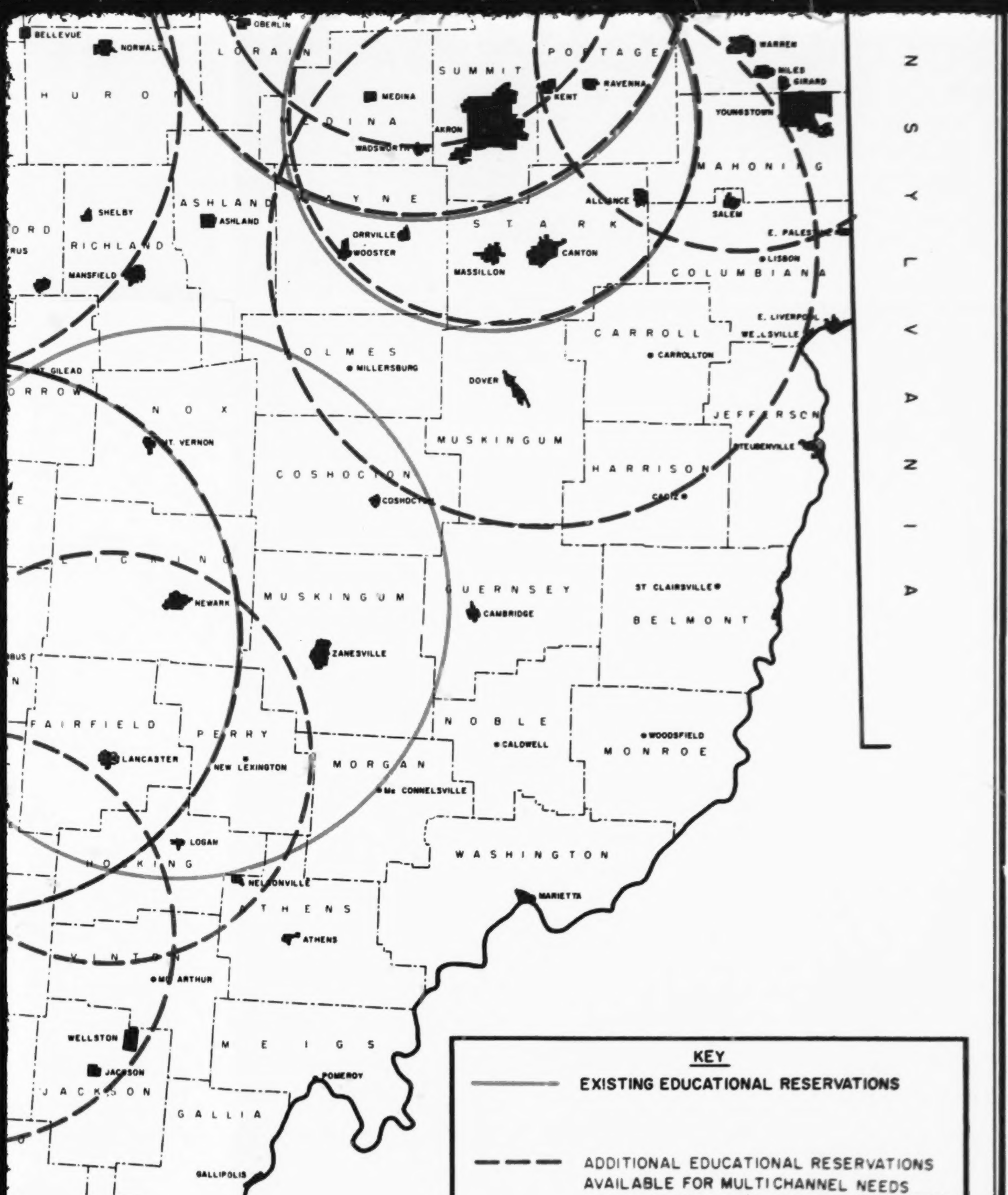
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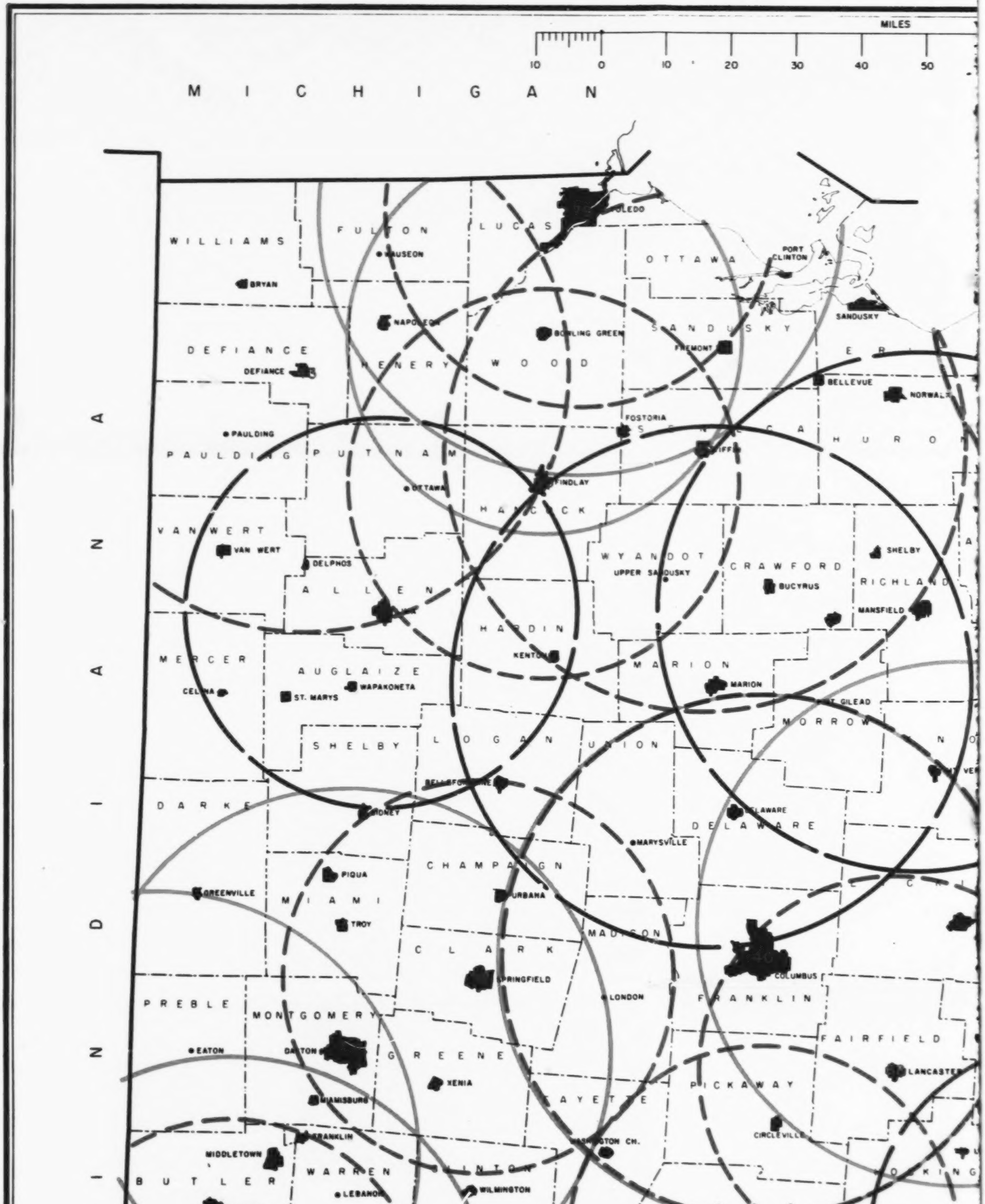
LAWRENCE
IRONTON
PENNSYLVANIA
KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS (NOTE: CHANNEL NO'S. LOCATED AT CENTER)

FIG. 6
PRESENT NATIONAL STUDY PROPOSED COVERAGE
FOR THE STATE OF OHIO

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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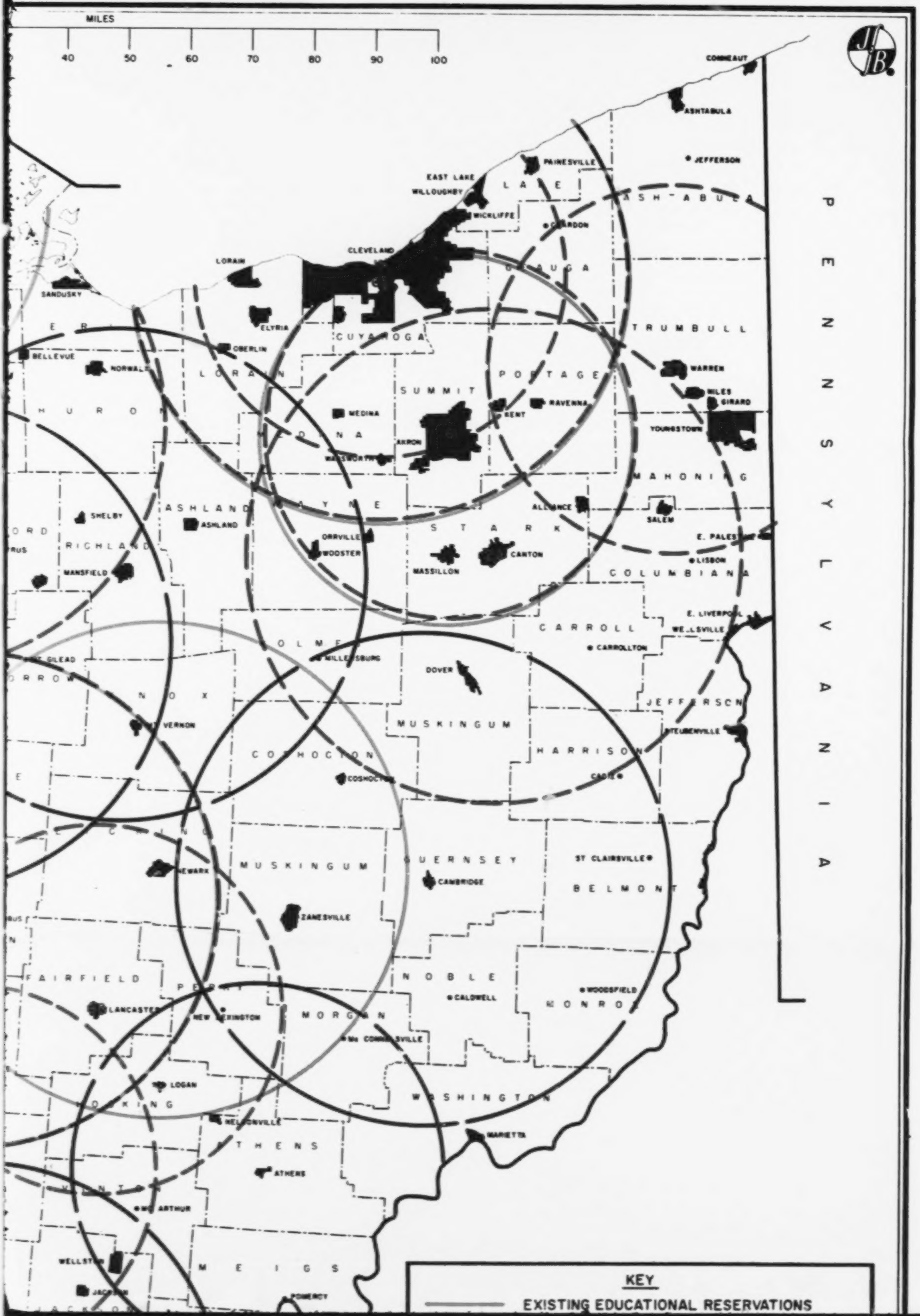
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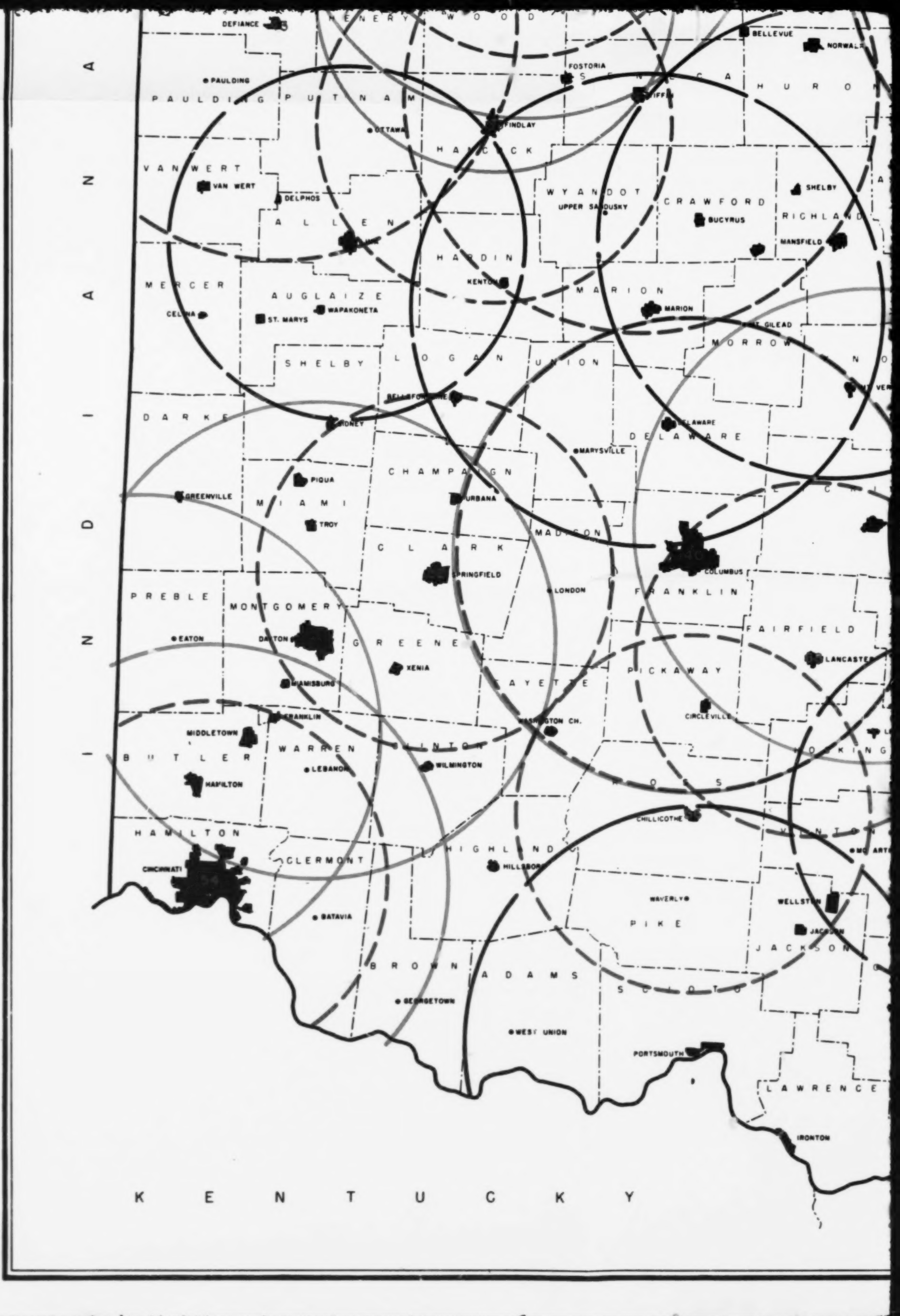
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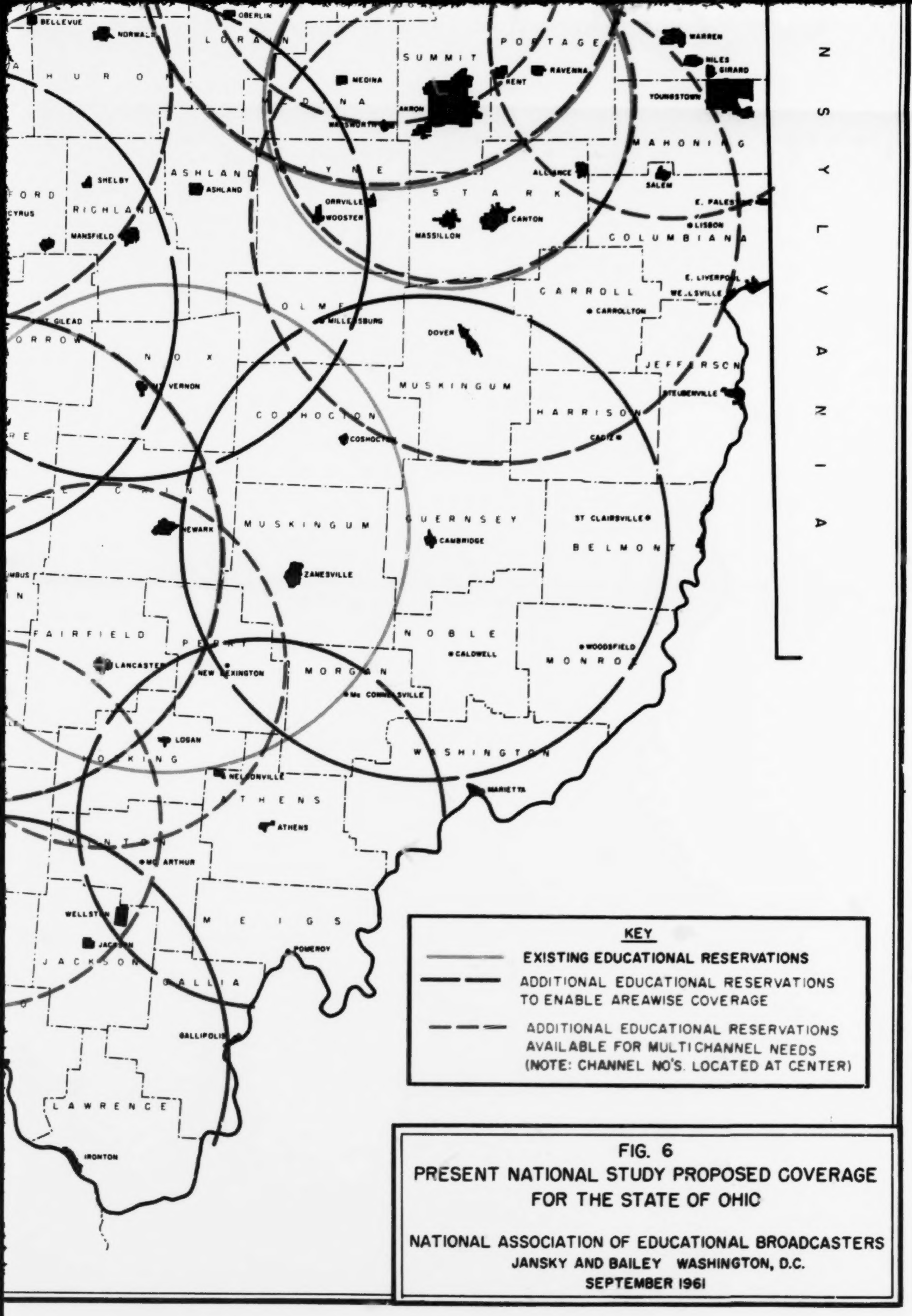
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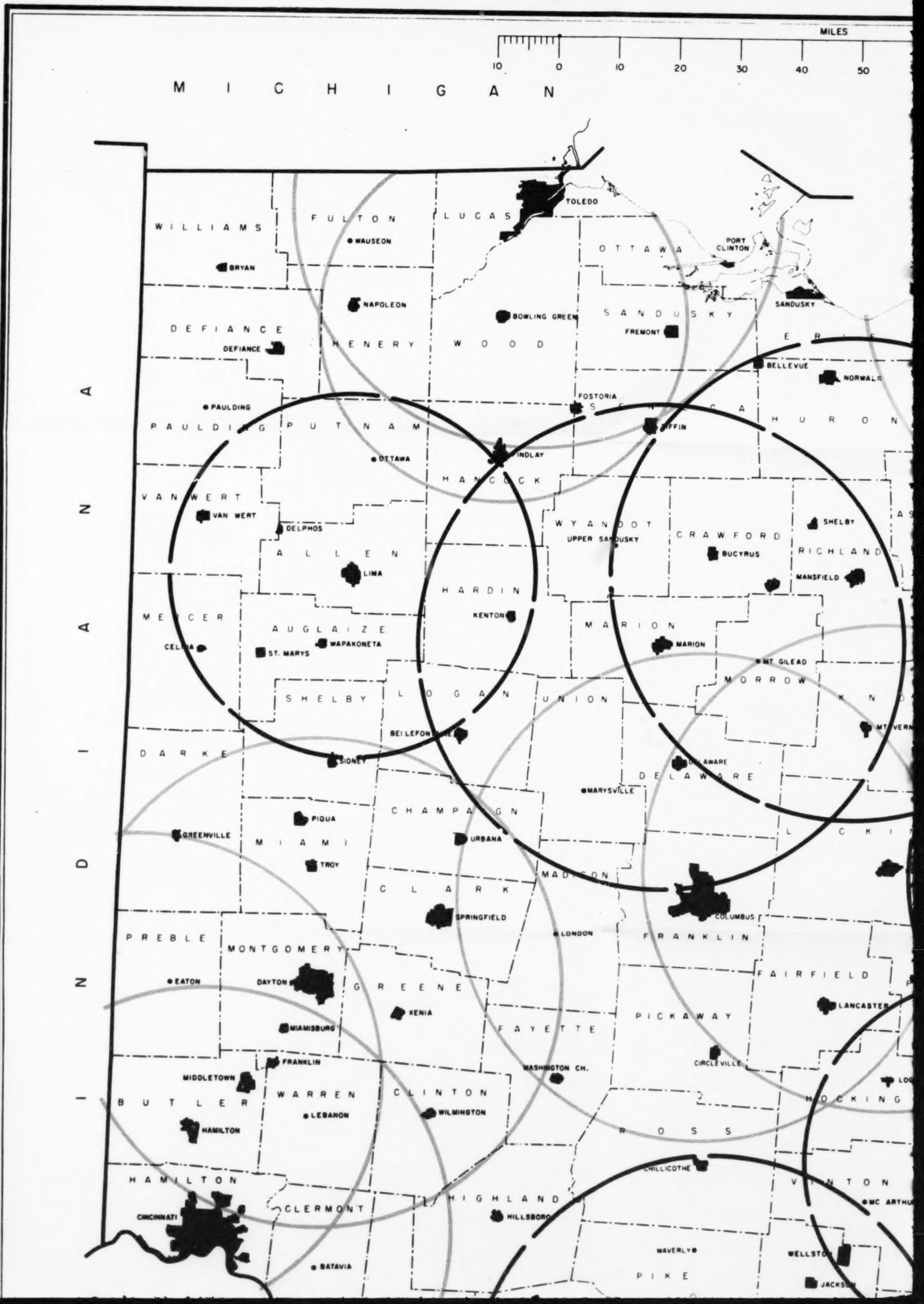
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE
ADDITIONAL EDUCATIONAL RESERVATIONS AVAILABLE FOR MULTICHANNEL NEEDS (NOTE: CHANNEL NO'S. LOCATED AT CENTER)

FIG. 6
PRESENT NATIONAL STUDY PROPOSED COVERAGE
FOR THE STATE OF OHIO

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961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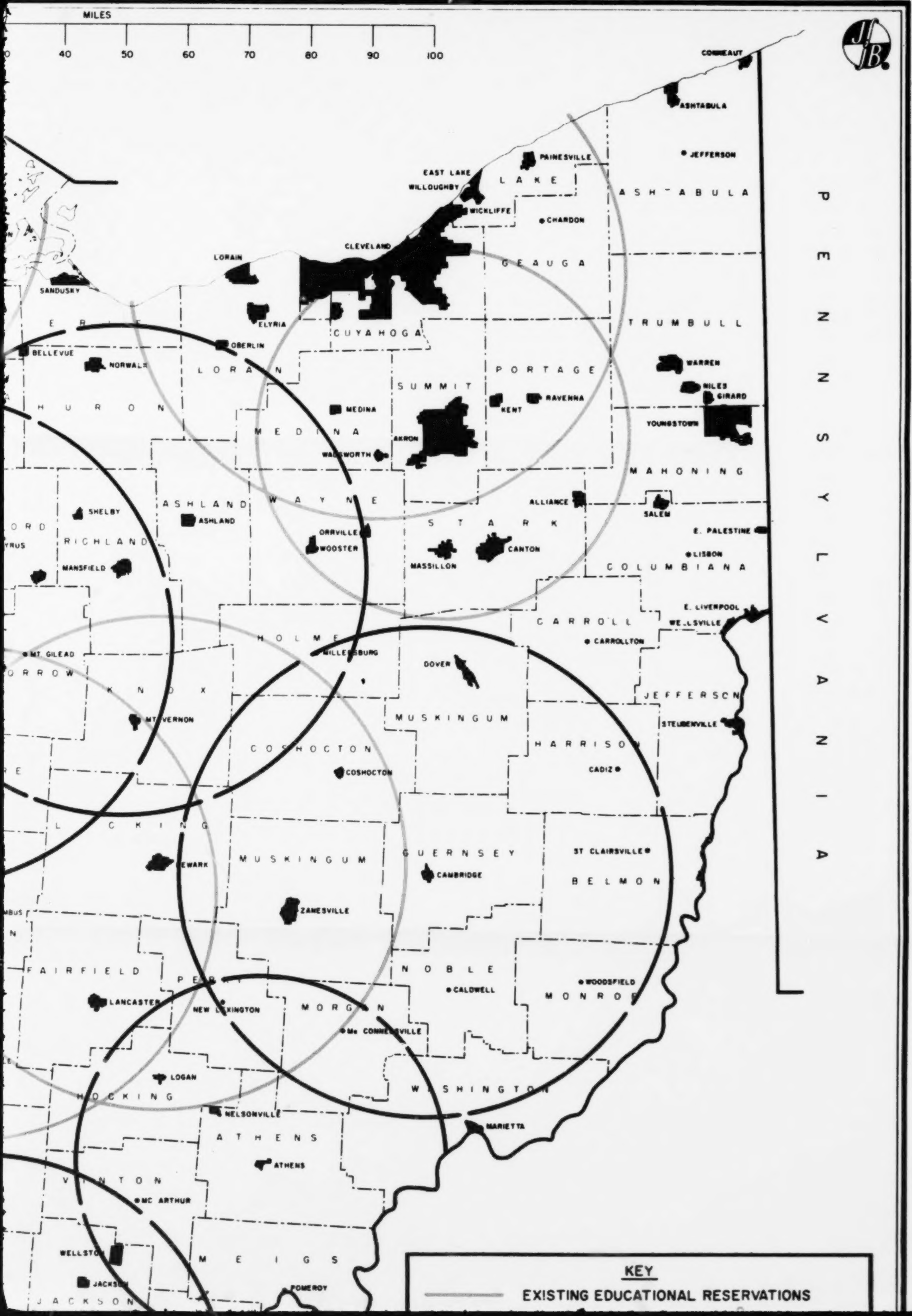
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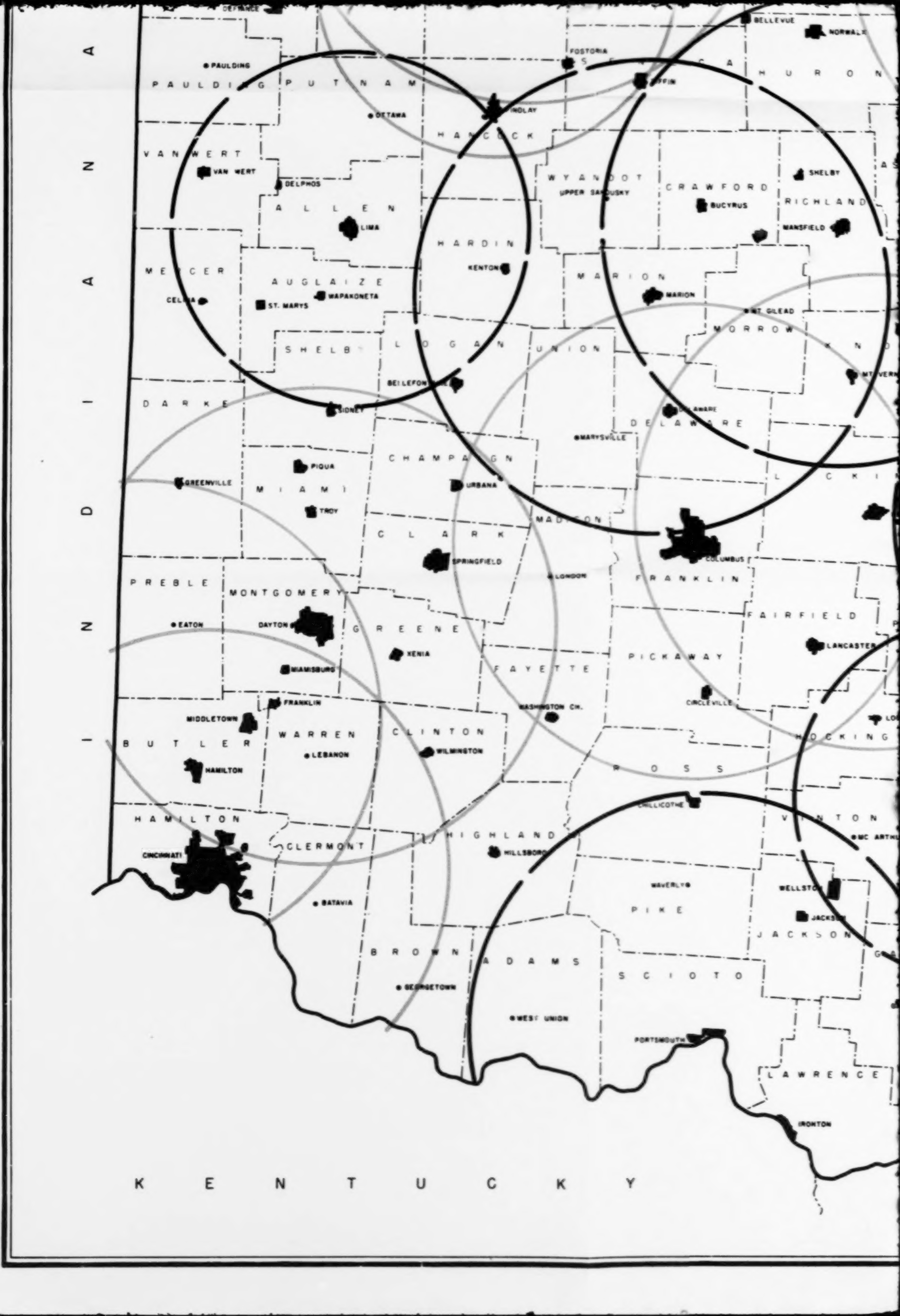
100
CONNEAUT
ASHTABULA
JEFFERSON
PAINESVILLE
EAST LAKE
WILLOUGHBY
LAKE
ASHTABULA
WICKLIFFE
CHARDON
CLEVELAND
LORAIN
GEAUGA
SANDUSKY
ELYRIA
ERIE
CUYAHOGA
TRUMBULL
OBERLIN
BELLEVUE
NORWALK
LORAIN
PORTAGE
WARREN
NILES
GIRARD
SUMMIT
KENT
RAVENNA
MEDINA
HURON
YOUNGSTOWN
MEDINA
AKRON
WADSWORTH
MAHONING
ASHLAND
WAYNE
ALLIANCE
SALEM
SHELBY
ASHLAND
STARK
ORRVILLE
WOOSTER
E. PALESTINE
RICHLAND
CANTON
MASSILLON
LISBON
MANSFIELD
COLUMBIANA
E. LIVERPOOL
WELLSVILLE
CARROLL
HOLMES
CARROLLTON
MT. GILEAD
MILLERSBURG
DOVER
KNOX
JEFFERSON
MUSKINGUM
MT. VERNON
STEUBENVILLE
COSHOCTON
HARRISON
COSHOCTON
CADIZ
LICKING
GUERNSEY
ST CLAIRSVILLE
MUSKINGUM
NEWARK
CAMBRIDGE
BELMONT
ZANESVILLE
FAIRFIELD
NOBLE
PERRY
WOODSFIELD
CALDWELL
LANCASTER
NEW LEXINGTON
MORGAN
MONROE
Mc CONNELSVILLE
LOGAN
HOCKING
WASHINGTON
NELSONVILLE
MARIETTA
ATHENS
ATHENS
VINTON
MC ARTHUR
WELLSTON
MEIGS
JACKSON
JACKSON
POMEROY
PENNSYLVANIA
KEY
EXISTING EDUCATIONAL RESERVATIONS


DEFIANCE
PAULDING
PAULDING
PUTNAM
OTTAWA
FOSTORIA
SENECA
TIFFIN
BELLEVUE
NORWALK
HURON
HANCOCK
FINDLAY
VAN WERT
VAN WERT
DELPHOS
ALLEN
LIMA
WYANDOT
UPPER SANDUSKY
CRAWFORD
BUCYRUS
SHELBY
RICHLAND
MANSFIELD
HARDIN
KENTON
MERCER
CELINA
AUGLAIZE
WAPAKONETA
ST. MARYS
MARION
MARION
MT. GILEAD
MORROW
SHELBY
LOGAN
UNION
BELLEFONTAINE
DARKE
SIDNEY
DELAWARE
DELAWARE
MARYSVILLE
CHAMPAIGN
URBANA
GREENVILLE
PIQUA
MIAMI
TROY
MADISON
CLARK
SPRINGFIELD
COLUMBUS
FRANKLIN
LONDON
PREBLE
MONTGOMERY
FAIRFIELD
EATON
DAYTON
GREENE
XENIA
LANCASTER
PICKAWAY
FAYETTE
MIAMISBURG
FRANKLIN
CIRCLEVILLE
WASHINGTON CH.
MIDDLETOWN
WARREN
CLINTON
BUTLER
LEBANON
WILMINGTON
HOCKING
HAMILTON
ROSS
CHILLICOTHE
HAMILTON
VINTON
CLERMONT
HIGHLAND
CINCINNATI
HILLSBORO
MC ARTHUR
WAVERLY
WELLSTON
BATAVIA
PIKE
JACKSON
JACKSON
BROWN
ADAMS
SCIOTO
GEORGETOWN
WEST UNION
PORTSMOUTH
LAWRENCE
IRONTON
INDIANA
KENTUCKY

641712 O - 62 (In Pocket)

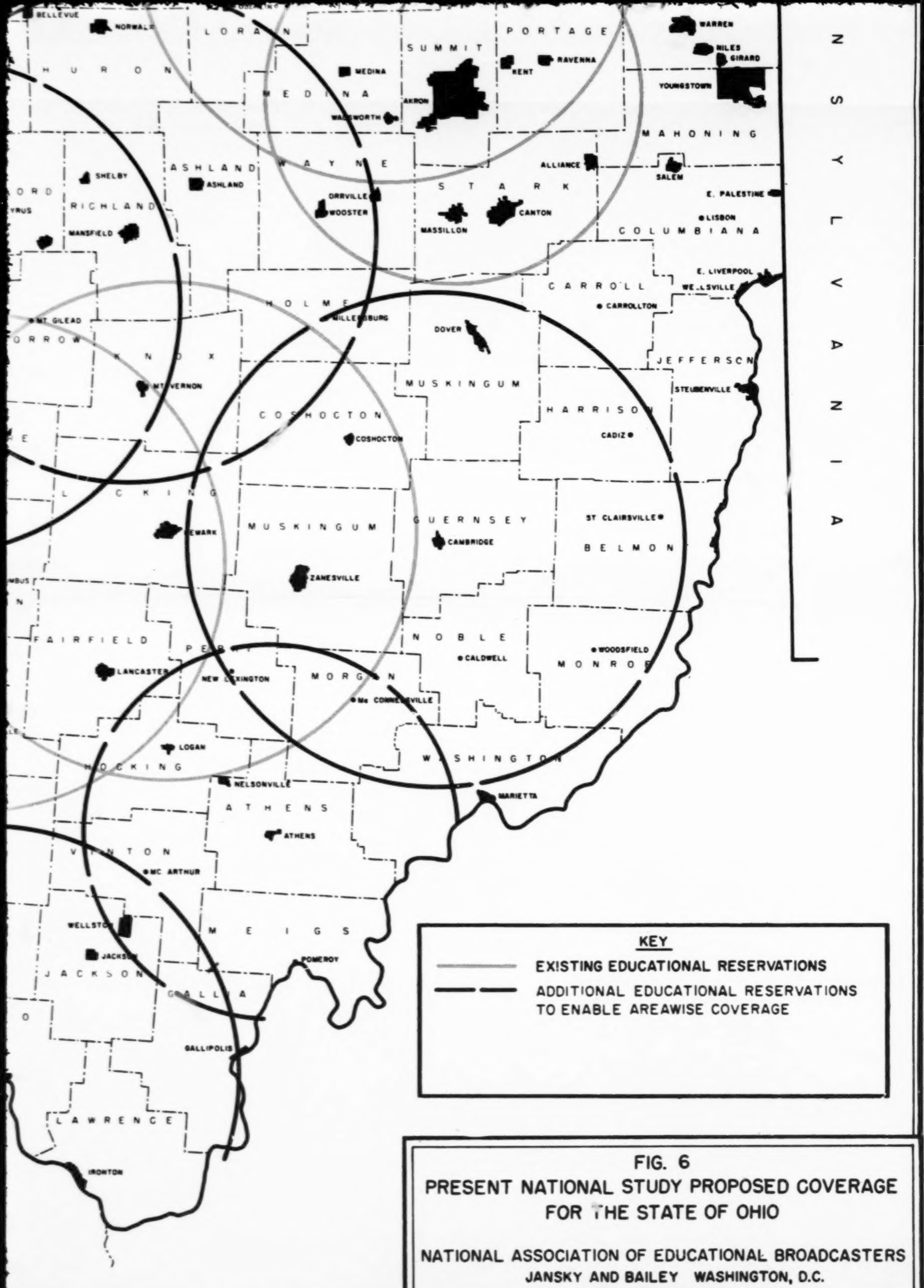
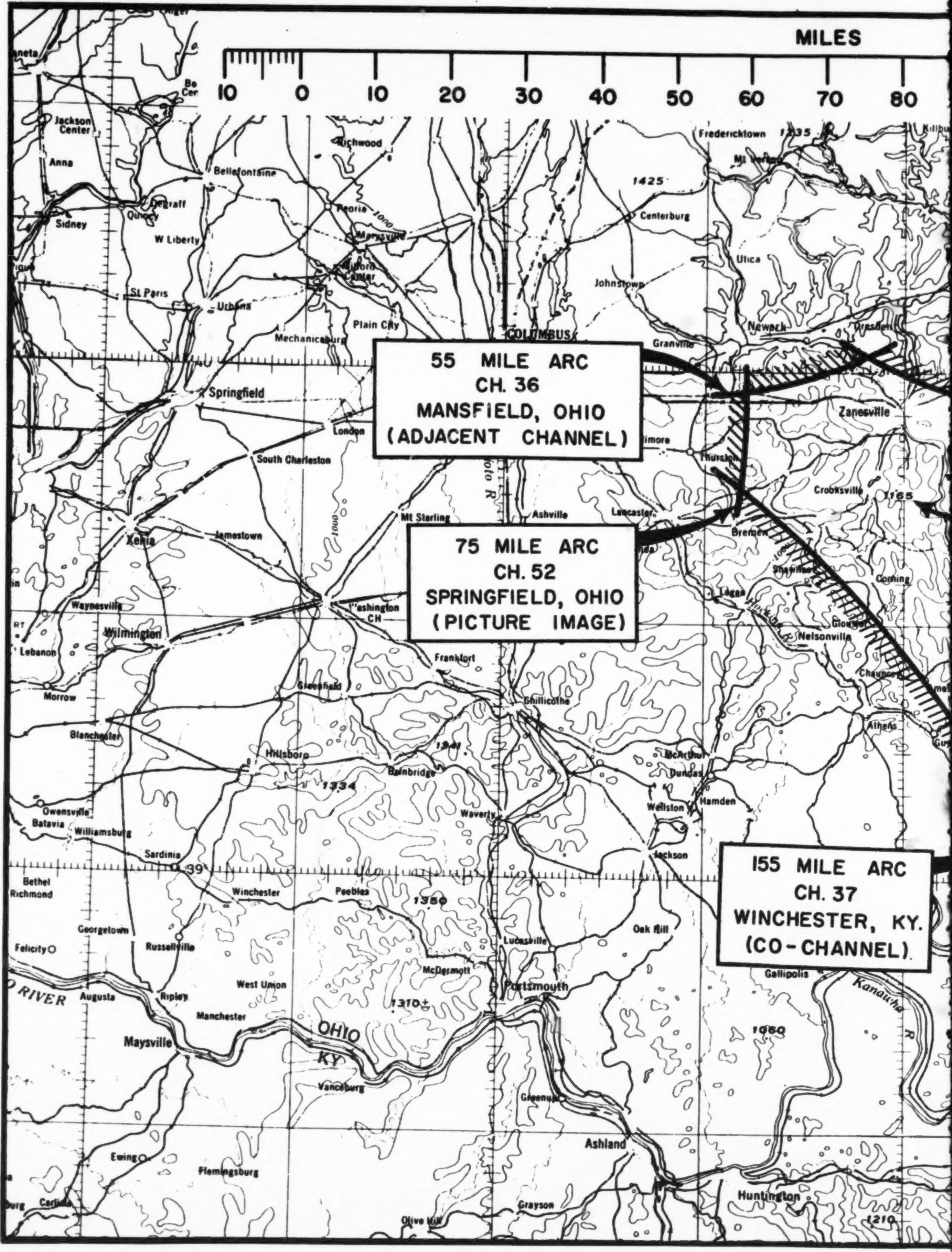

BELLEVUE
NORWALK
LORAIN
HURON
SUMMIT
PORTAGE
WARREN
NILES
GIRARD
YOUNGSTOWN
MEDINA
KENT
RAVENNA
AKRON
WADSWORTH
MAHONING
ASHLAND
WAYNE
SHELBY
RICHLAND
ALLIANCE
SALEM
STARK
ORRVILLE
WOOSTER
CANTON
MASSILLON
E. PALESTINE
LISBON
COLUMBIANA
MANSFIELD
E. LIVERPOOL
WELLSVILLE
CARROLL
CARROLLTON
HOLMES
MILLERSBURG
MT. GILEAD
MORROW
DOVER
KNOX
JEFFERSON
MT VERNON
TUSCARAWAS
STEUBENVILLE
COSHOCTON
HARRISON
CADIZ
LICKING
GUERNSEY
ST CLAIRSVILLE
NEWARK
MUSKINGUM
CAMBRIDGE
BELMONT
ZANESVILLE
FAIRFIELD
PERRY
NOBLE
WOODSFIELD
CALDWELL
MONROE
LANCASTER
NEW LEXINGTON
MORGAN
Mc CONNELSVILLE
LOGAN
WASHINGTON
HOCKING
NELSONVILLE
MARIETTA
ATHENS
VINTON
MC ARTHUR
WELLSTON
MEIGS
JACKSON
POMEROY
GALLIA
GALLIPOLIS
LAWRENCE
IRONTON
PENNSYLVANIA
KEY
EXISTING EDUCATIONAL RESERVATIONS
ADDITIONAL EDUCATIONAL RESERVATIONS TO ENABLE AREAWISE COVERAGE

FIG. 6
PRESENT NATIONAL STUDY PROPOSED COVERAGE
FOR THE STATE OF OHIO

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY AND BAILEY WASHINGTON, D.C.
SEPTEMBER 1961

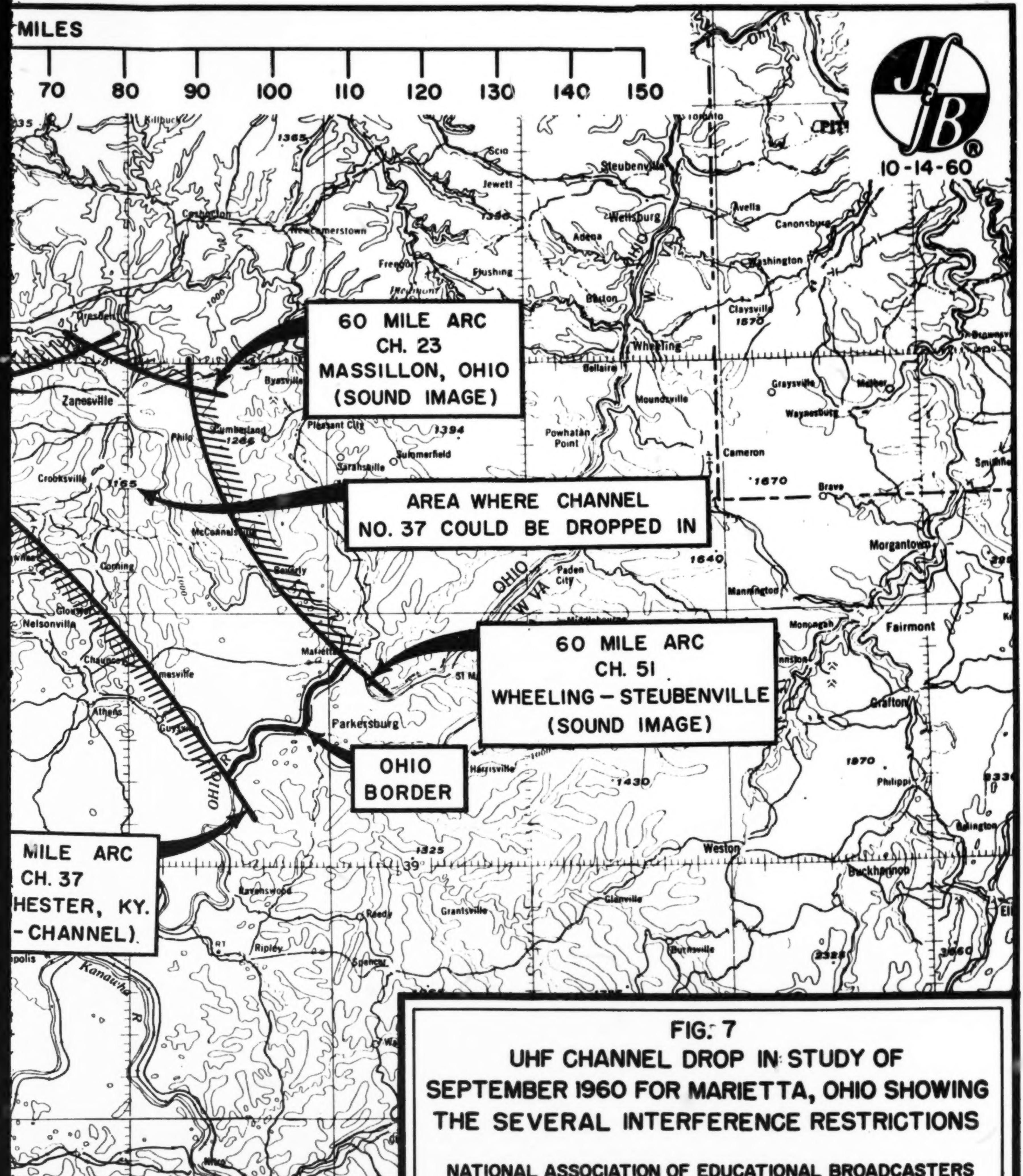
Fig-7


MILES
10 0 10 20 30 40 50 60 70 80
Columbus
Springfield
Zanesville
Newark
Chillicothe
Portsmouth
Ashland
Huntington
Maysville
Athens
Lancaster
Xenia
Wilmington
Hillsboro
Jackson
Gallipolis
OHIO
KY
Kanawha R
RIVER

55 MILE ARC
CH. 36
MANSFIELD, OHIO
(ADJACENT CHANNEL)

75 MILE ARC
CH. 52
SPRINGFIELD, OHIO
(PICTURE IMAGE)

155 MILE ARC
CH. 37
WINCHESTER, KY.
(CO-CHANNEL)


MILES
70
80
90
100
110
120
130
140
150
J&B
10-14-60
Killbuck
Scio
Jewett
Steubenville
Toronto
Coshocton
Newcomerstown
Wellsburg
Avella
Canonsburg
Adena
Washington
Freeport
Flushing
Barton
Claysville
1570
Dresden
Wheeling
Bellaire
Moundsville
Graysville
Waynesburg
Zanesville
Byesville
Philo
Cumberland
1266
Pleasant City
1394
Powhatan Point
Cameron
Summerfield
Sarahsville
Crooksville
1165
1670
Brave
McConnelsville
Morgantown
Corning
1640
Paden City
OHIO
W VA
Mannington
Glouster
Nelsonville
Marietta
Monongah
Fairmont
Chauncey
Athens
Parkersburg
Grafton
Guysville
OHIO R
Harrisville
1970
Philippi
1430
1325
39
Weston
Buckhannon
Ravenswood
Glenville
Reedy
Grantsville
Ripley
Spencer
Burnsville
2328
Kanawha R
Charleston
1210

60 MILE ARC
CH. 23
MASSILLON, OHIO
(SOUND IMAGE)

AREA WHERE CHANNEL
NO. 37 COULD BE DROPPED IN

60 MILE ARC
CH. 51
WHEELING – STEUBENVILLE
(SOUND IMAGE)

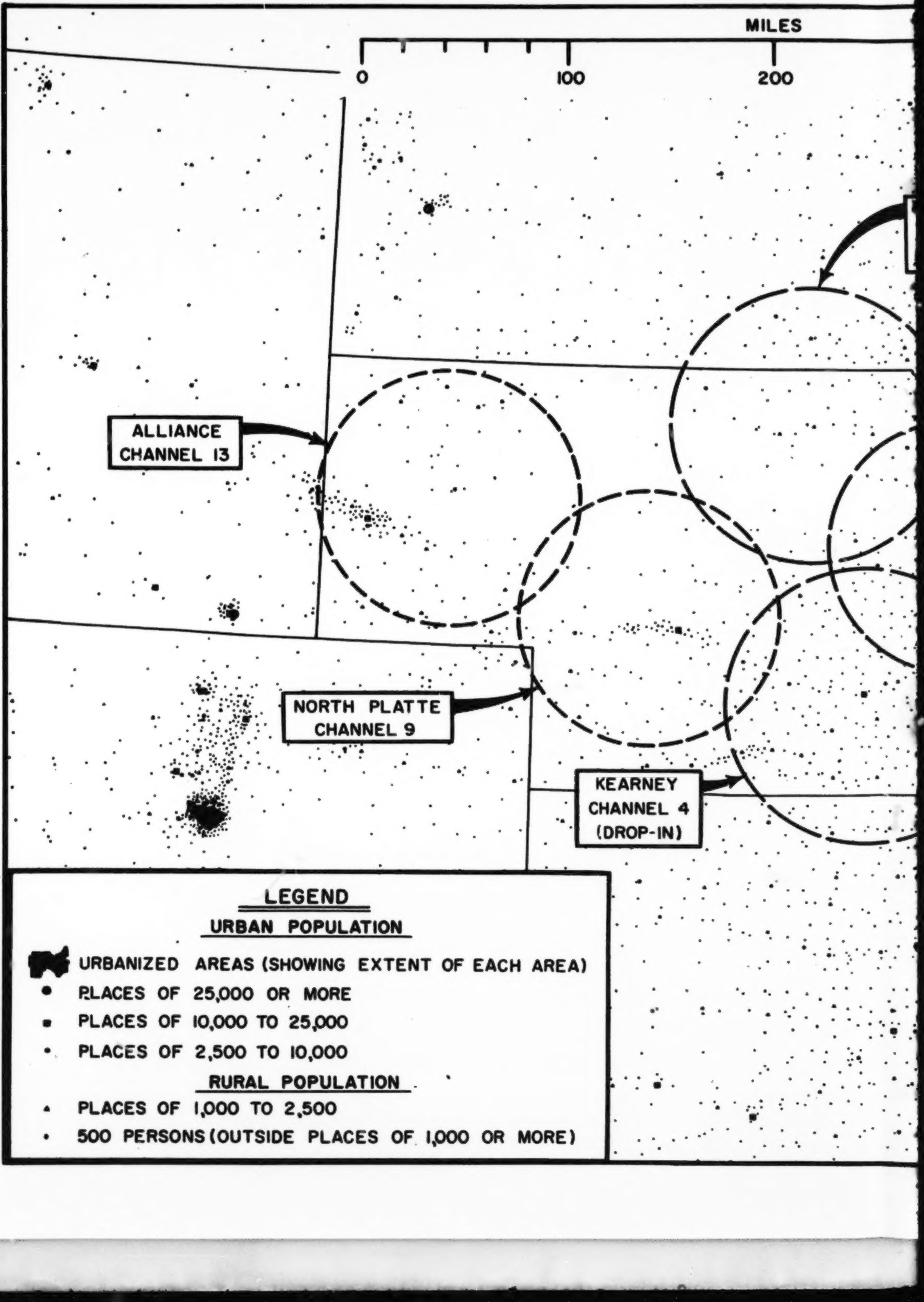
OHIO
BORDER

MILE ARC
CH. 37
HESTER, KY.
– CHANNEL).

FIG. 7
UHF CHANNEL DROP IN STUDY OF
SEPTEMBER 1960 FOR MARIETTA, OHIO SHOWING
THE SEVERAL INTERFERENCE RESTRICTIONS

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY & BAILEY WASHINGTON, D. C.

FIG. 8



MILES
0
100
200
ALLIANCE
CHANNEL 13
NORTH PLATTE
CHANNEL 9
KEARNEY
CHANNEL 4
(DROP-IN)
LEGEND
URBAN POPULATION
URBANIZED AREAS (SHOWING EXTENT OF EACH AREA)
● PLACES OF 25,000 OR MORE
■ PLACES OF 10,000 TO 25,000
• PLACES OF 2,500 TO 10,000
RURAL POPULATION
▲ PLACES OF 1,000 TO 2,500
• 500 PERSONS (OUTSIDE PLACES OF 1,000 OR MORE)

641712 O - 62 (Follows Text) No. 3

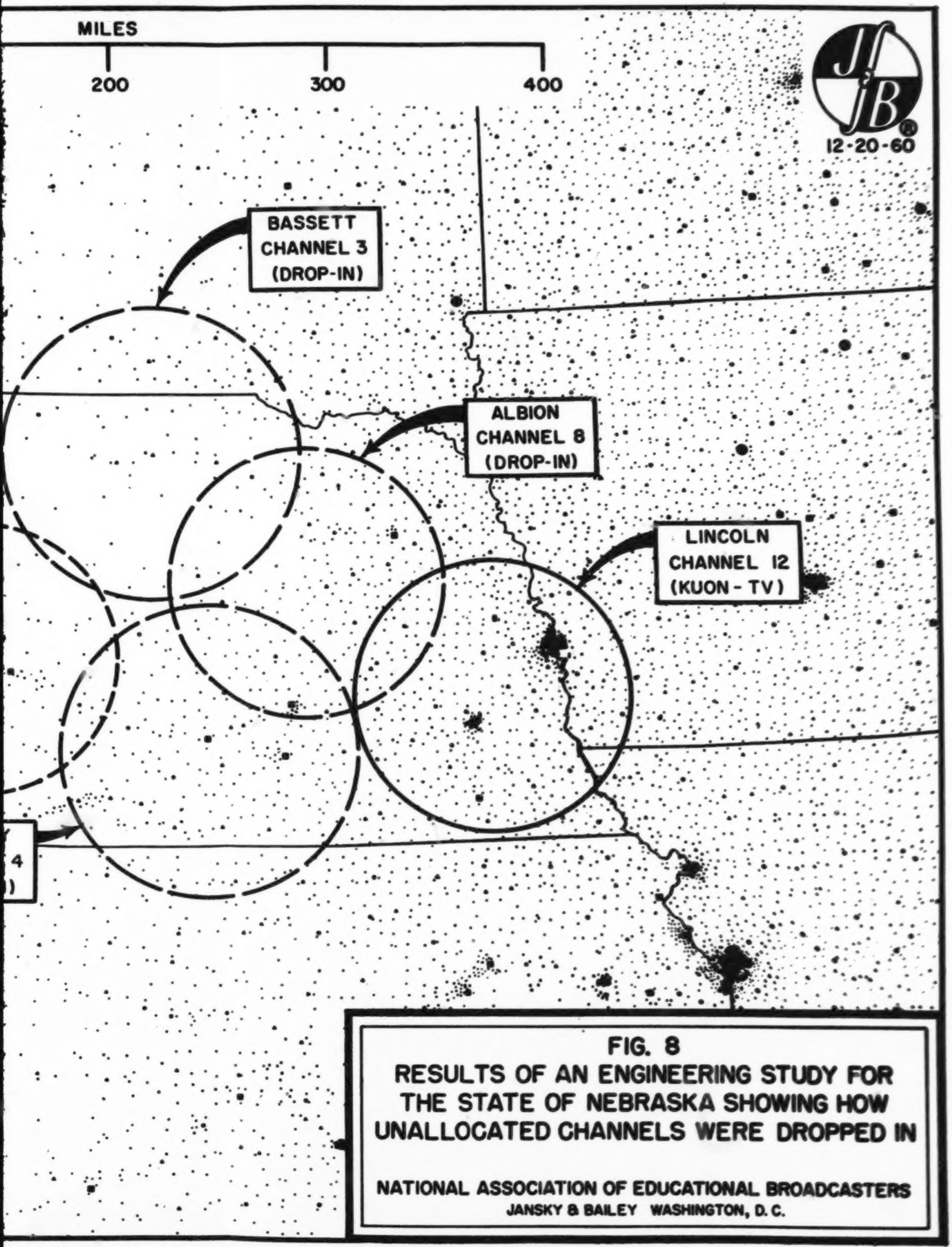
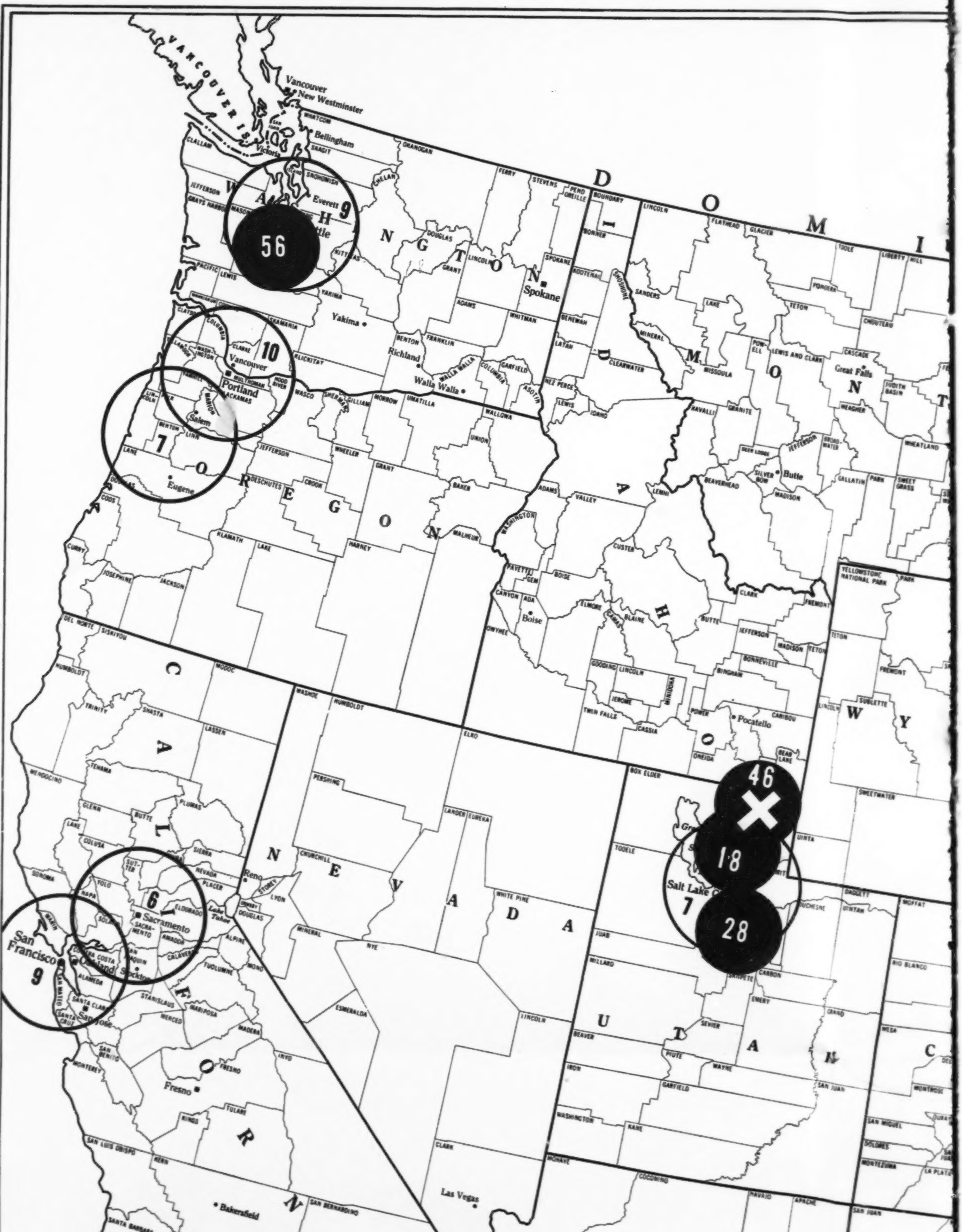
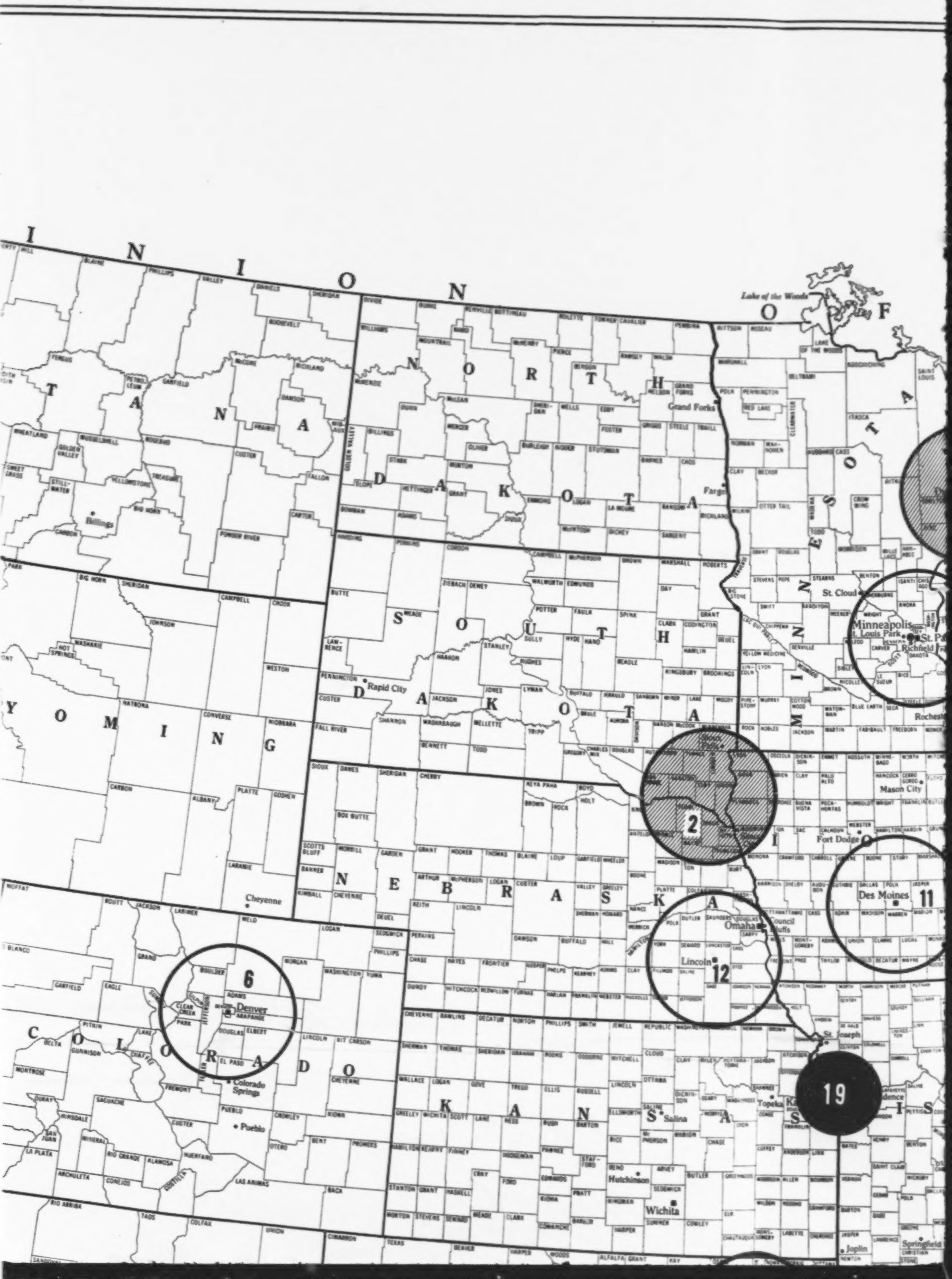
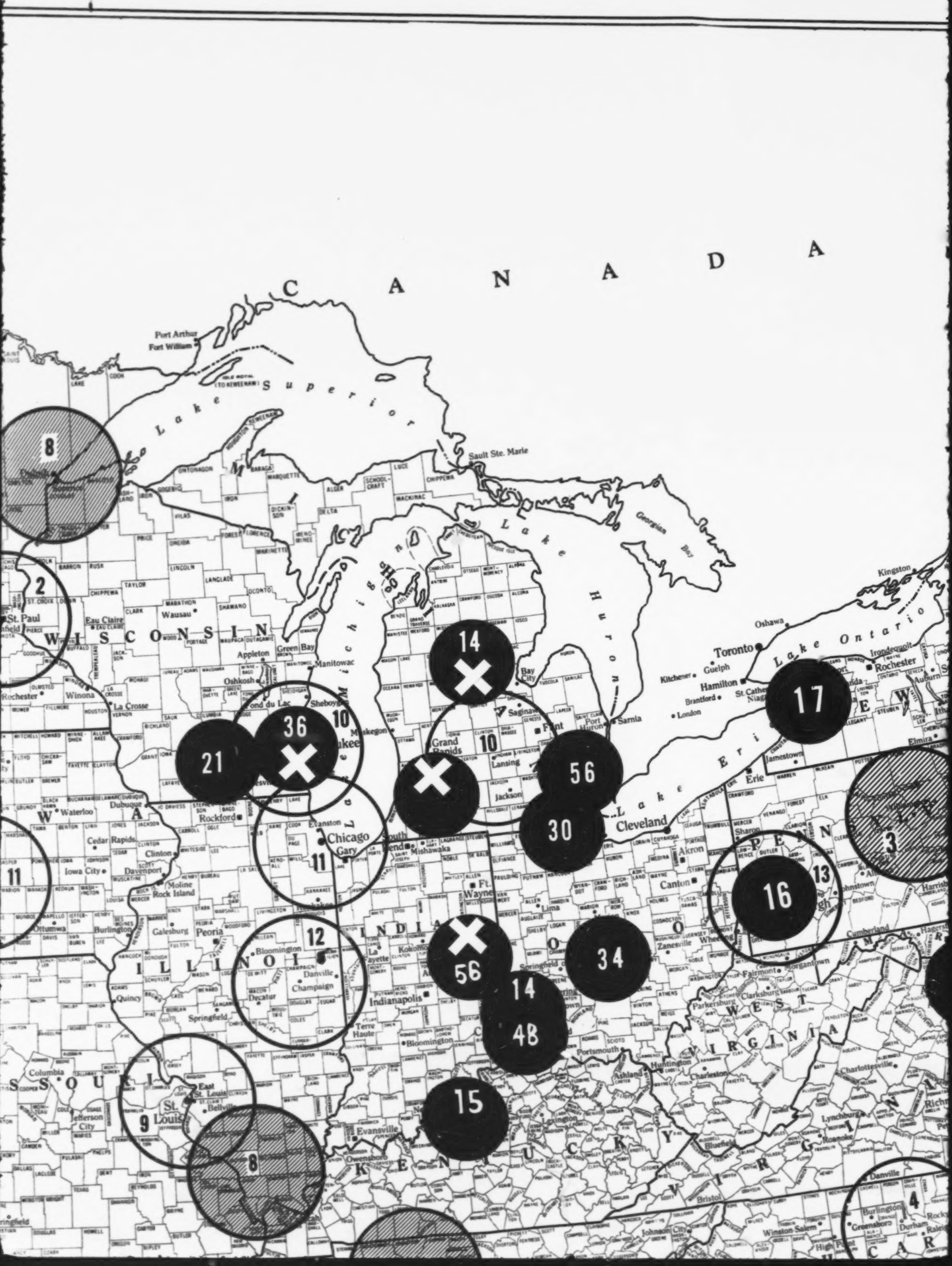

MILES
200
300
400
12-20-60
BASSETT
CHANNEL 3
(DROP-IN)
ALBION
CHANNEL 8
(DROP-IN)
LINCOLN
CHANNEL 12
(KUON - TV)
4
)

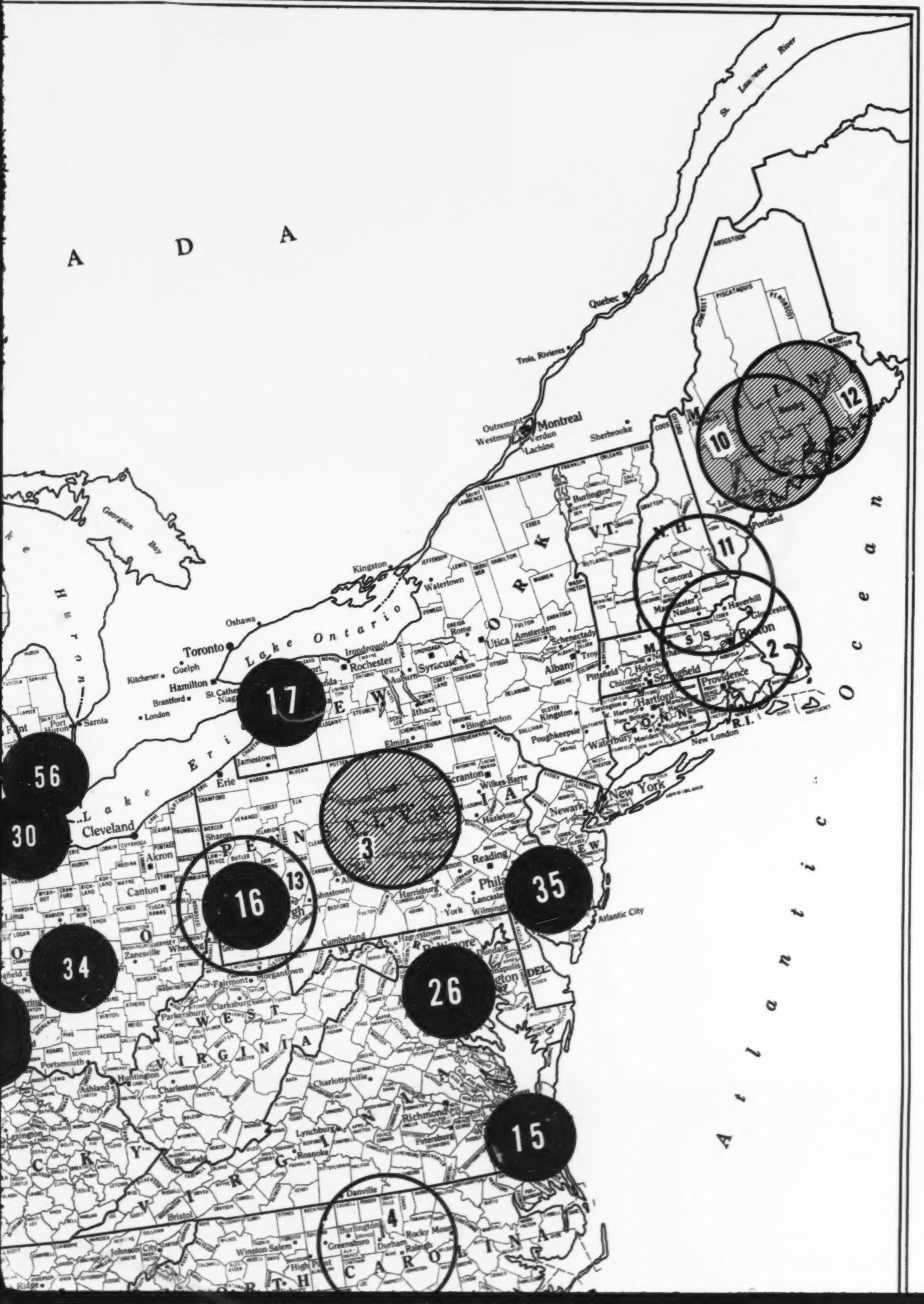
FIG. 8
RESULTS OF AN ENGINEERING STUDY FOR THE STATE OF NEBRASKA SHOWING HOW UNALLOCATED CHANNELS WERE DROPPED IN

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS
JANSKY & BAILEY WASHINGTON, D. C.

VANCOUVER IS.
Vancouver
New Westminster
Victoria
Bellingham
Everett
Seattle
9
56
WASHINGTON
Spokane
Yakima
Richland
Walla Walla
Vancouver
10
Portland
Salem
7
Eugene
OREGON
Boise
IDAHO
Pocatello
DOMINION
MONTANA
Great Falls
Butte
WY
Reno
Lake Tahoe
NEVADA
Las Vegas
Sacramento
6
San Francisco
Oakland
Stockton
San Jose
9
Fresno
Bakersfield
Santa Barbara
CALIFORNIA
46
×
18
Salt Lake City
7
28
UTAH
C


DOMINION OF
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
WYOMING
NEBRASKA
COLORADO
KANSAS
MINNESOTA
IOWA
Lake of the Woods
Billings
Grand Forks
Fargo
Rapid City
Sioux Falls
St. Cloud
Minneapolis
St. Louis Park
St. Paul
Richfield
Mason City
Fort Dodge
Des Moines
Omaha
Council Bluffs
Lincoln
Cheyenne
Denver
Colorado Springs
Pueblo
St. Joseph
Topeka
Salina
Hutchinson
Wichita
Joplin
Springfield
Rochester
2
6
11
12
19


C A N A D A
Lake Superior
Lake Michigan
Lake Huron
Georgian Bay
Lake Erie
Lake Ontario
Port Arthur
Fort William
Sault Ste. Marie
Duluth
St. Paul
Rochester
Winona
La Crosse
Eau Claire
Wausau
Appleton
Green Bay
Oshkosh
Manitowac
Fond du Lac
Sheboygan
Muskegon
Grand Rapids
Bay City
Saginaw
Flint
Lansing
Jackson
Port Huron
Sarnia
Toronto
Oshawa
Kingston
Guelph
Kitchener
Hamilton
Brantford
London
Rochester
Irondequoit
Auburn
Jamestown
Elmira
Erie
Cleveland
Akron
Canton
Sharon
Johnstown
Harrisburg
Cumberland
Wheeling
Zanesville
Lima
Ft. Wayne
South Bend
Mishawaka
Chicago
Evanston
Gary
Rockford
Dubuque
Waterloo
Cedar Rapids
Iowa City
Clinton
Davenport
Moline
Rock Island
Galesburg
Peoria
Burlington
Ottumwa
Bloomington
Danville
Champaign
Decatur
Springfield
Quincy
Kokomo
La Fayette
Indianapolis
Terre Haute
Bloomington
Evansville
Owensboro
Columbia
Jefferson City
St. Louis
East St. Louis
Belleville
Portsmouth
Ashland
Huntington
Charleston
Parkersburg
Clarksburg
Fairmont
Morgantown
Bluefield
Roanoke
Lynchburg
Charlottesville
Bristol
Johnson City
Winston-Salem
High Point
Greensboro
Burlington
Durham
Danville
WISCONSIN
IOWA
ILLINOIS
INDIANA
OHIO
MISSOURI
KENTUCKY
WEST VIRGINIA
VIRGINIA
PENNSYLVANIA
NEW YORK
MICHIGAN
8
2
36
10
21
14
10
56
30
17
3
11
11
16
13
12
56
34
14
48
15
9
8
4


A D A
St. Lawrence River
Quebec
Trois Rivieres
Montreal
Outremont
Westmount
Verdun
Lachine
Sherbrooke
Georgian Bay
Lake Huron
Lake Ontario
Lake Erie
Kingston
Oshawa
Toronto
Guelph
Kitchener
Hamilton
Brantford
St. Catharines
Niagara
London
Sarnia
Port Huron
Flint
Cleveland
Akron
Canton
Lima
Zanesville
Wheeling
Erie
Jamestown
Sharon
Watertown
Rochester
Irondequoit
Syracuse
Rome
Utica
Amsterdam
Schenectady
Troy
Albany
Auburn
Ithaca
Elmira
Binghamton
Kingston
Poughkeepsie
Burlington
V.T.
N.H.
Concord
Manchester
Nashua
Haverhill
Gloucester
Boston
Pittsfield
Holyoke
Chicopee
Springfield
Providence
R.I.
Hartford
Waterbury
New London
CONN.
Portland
New York
Newark
Scranton
Wilkes-Barre
Hazleton
Reading
Harrisburg
Johnstown
York
Lancaster
Philadelphia
Wilmington
Atlantic City
Cumberland
Hagerstown
Baltimore
Dundalk
Annapolis
Washington
DEL.
Fairmont
Morgantown
Clarksburg
Parkersburg
WEST VIRGINIA
Huntington
Charleston
Ashland
Portsmouth
Lexington
Bluefield
Charlottesville
Richmond
Lynchburg
Petersburg
Roanoke
VIRGINIA
Bristol
Danville
Burlington
Greensboro
Durham
Raleigh
Rocky Mount
Winston Salem
High Point
Johnson City
NORTH CAROLINA
Atlantic Ocean
17
56
30
16
13
34
3
35
26
15
4
10
11
12
2

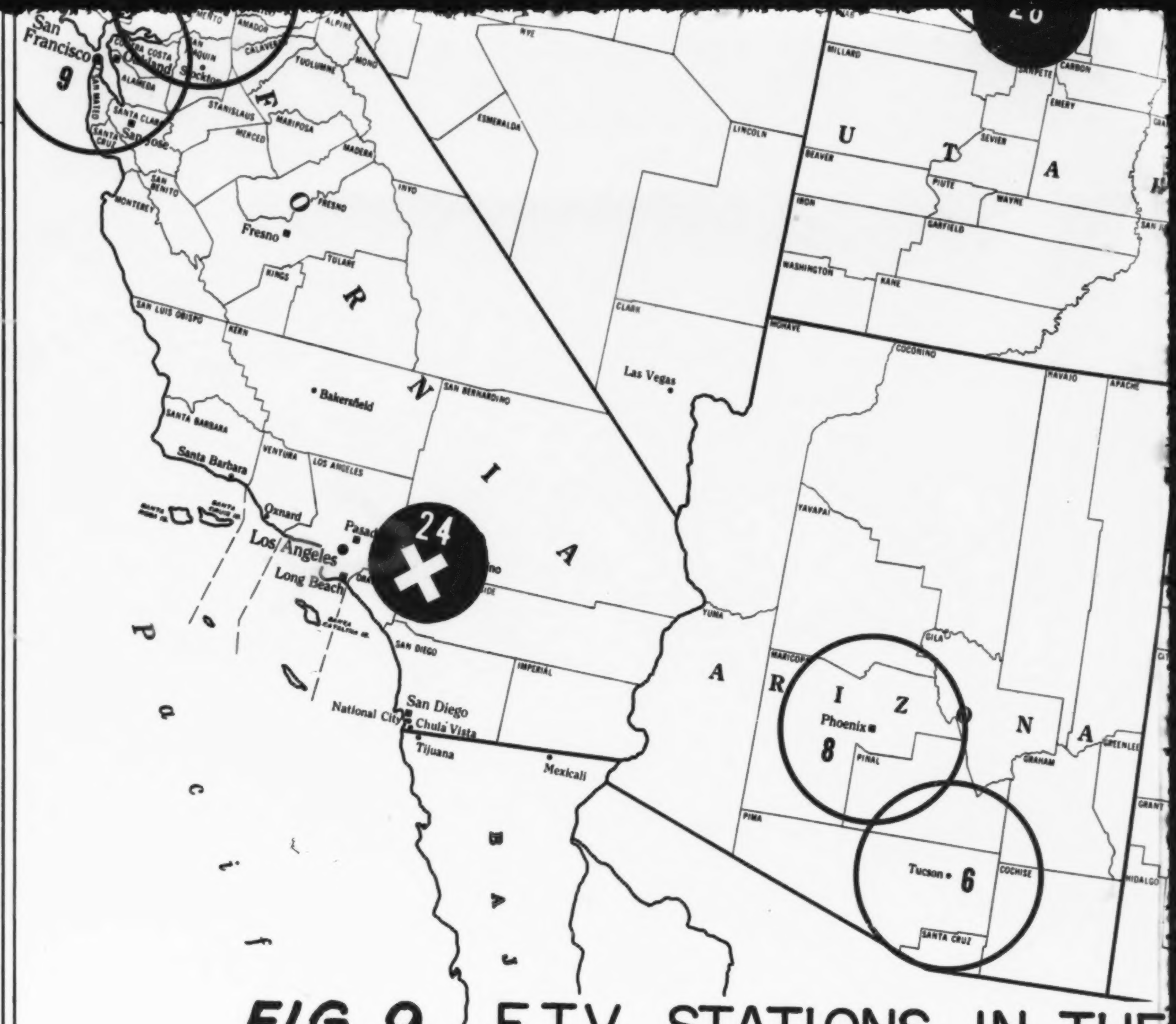

San Francisco
9
Oakland
Stockton
San Jose
Fresno
Bakersfield
Santa Barbara
Oxnard
Pasad
Los Angeles
Long Beach
24
San Diego
National City
Chula Vista
Tijuana
Mexicali
Las Vegas
Phoenix
8
Tucson
6
C A L I F O R N I A
U T A
A R I Z O N A
B A J
P a c i f i c

FIG. 9 ETV STATIONS IN THE

○ VHF STATIONS ON AIR

▨ VHF STATIONS WITH C

● UHF STATIONS ON AI

⊗ UHF STATIONS PLANNE

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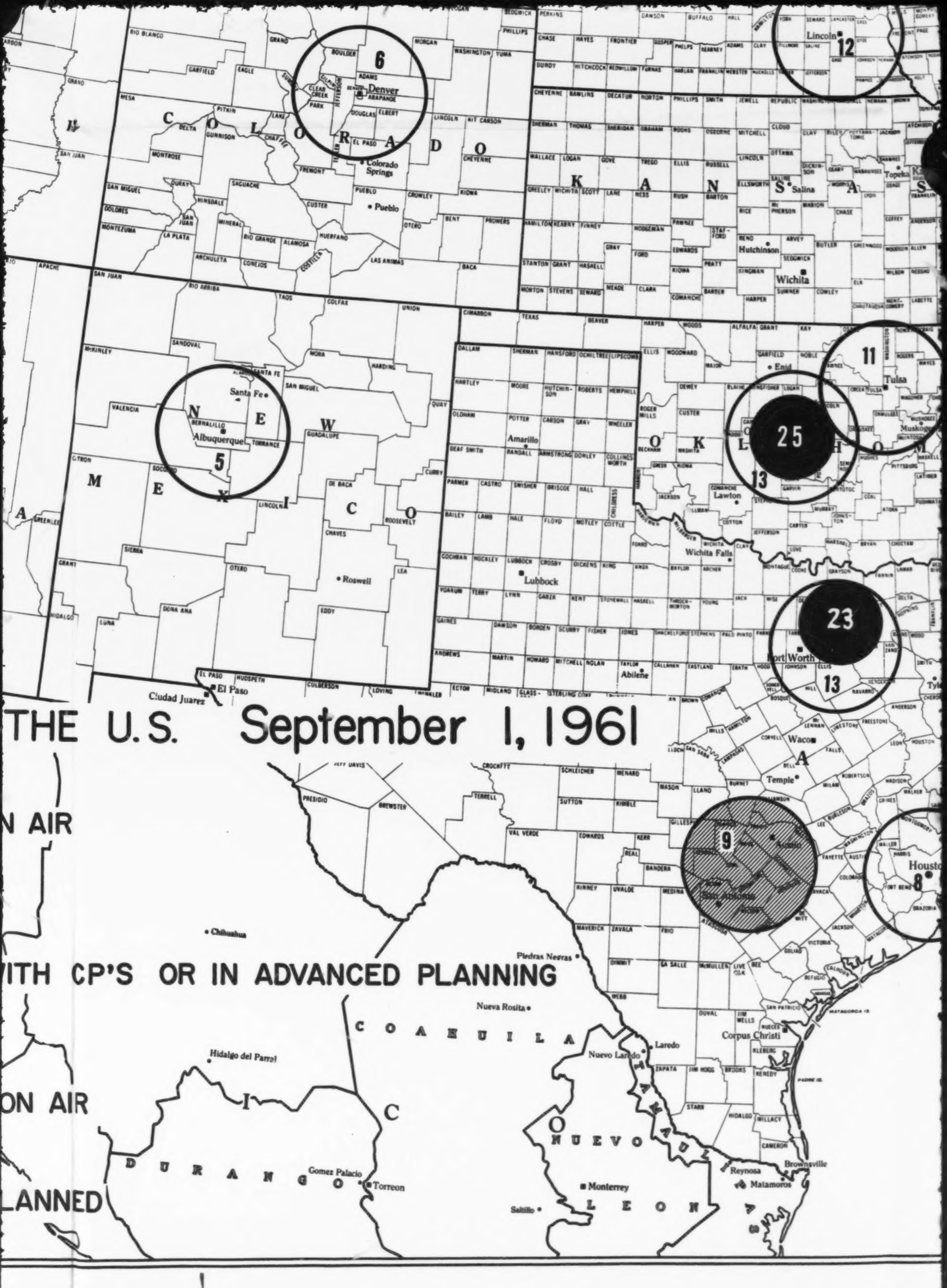

6
Denver
Colorado Springs
Pueblo
C O L O R A D O
12
Lincoln
K A N S A S
Salina
Topeka
Hutchinson
Wichita
N E W M E X I C O
Santa Fe
Albuquerque
5
Roswell
El Paso
Ciudad Juarez
O K L A H O M A
11
Tulsa
Muskogee
Enid
25
13
Lawton
Wichita Falls
Amarillo
Lubbock
Abilene
23
Fort Worth
13
Waco
Temple
9
Austin
San Antonio
Houston
8
Corpus Christi
Laredo
Nuevo Laredo
Brownsville
Reynosa
Matamoros
Piedras Negras
Nueva Rosita
Chihuahua
Hidalgo del Parral
Gomez Palacio
Torreon
Monterrey
Saltillo
COAHUILA
DURANGO
NUEVO LEON
TAMAULIPAS
M E X I C O

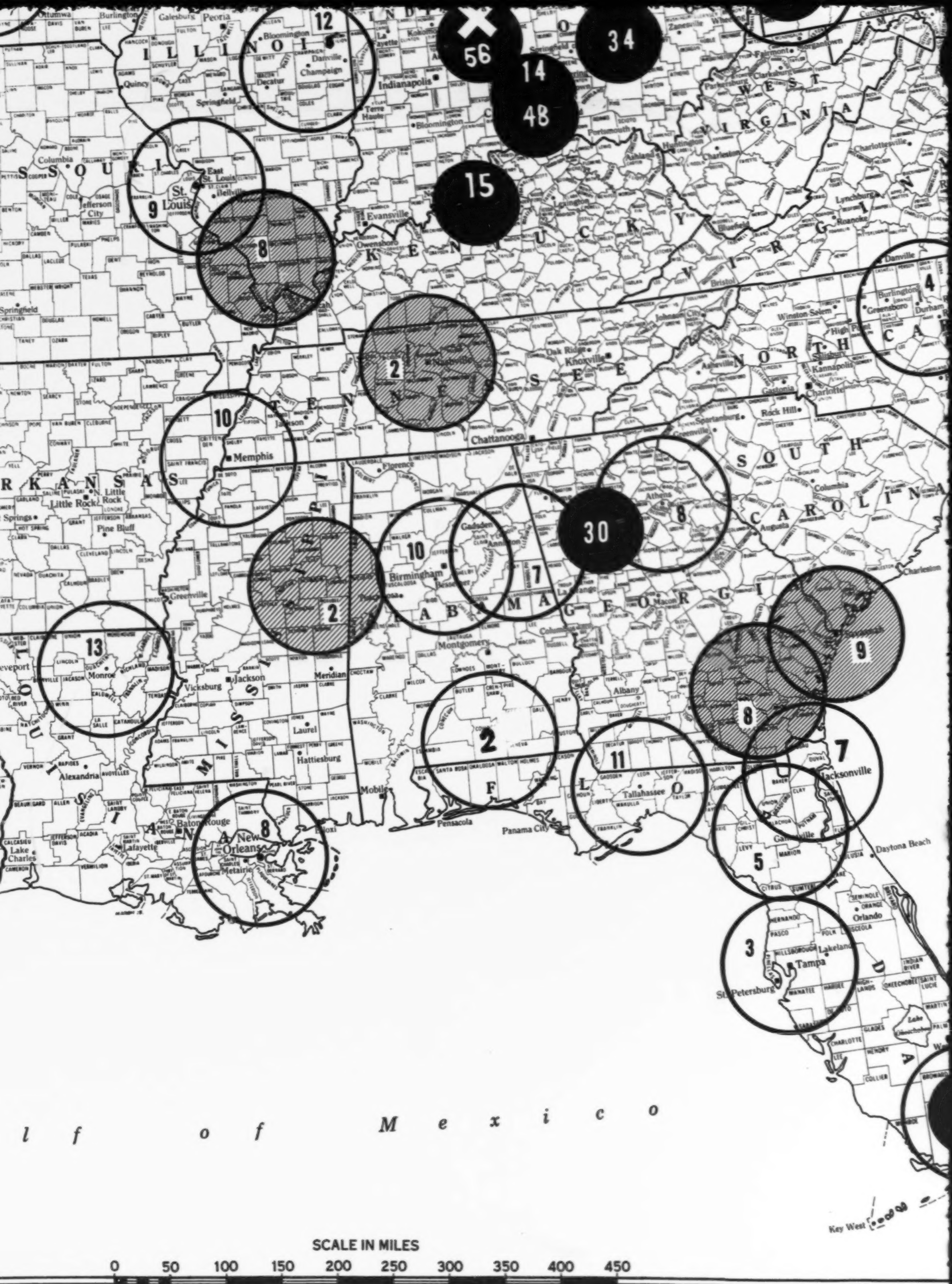
THE U.S. September 1, 1961

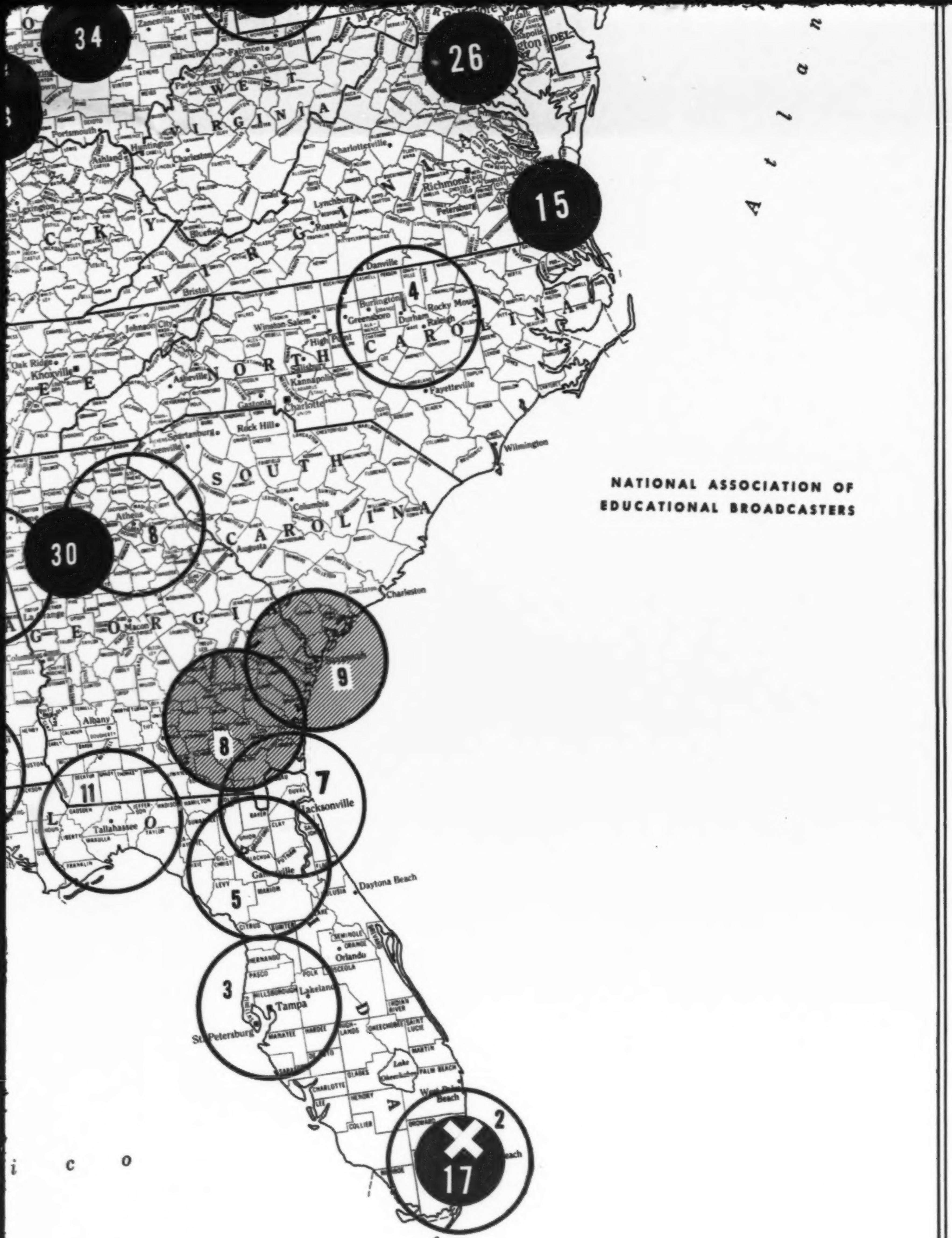
N AIR

VITH CP'S OR IN ADVANCED PLANNING

ON AIR

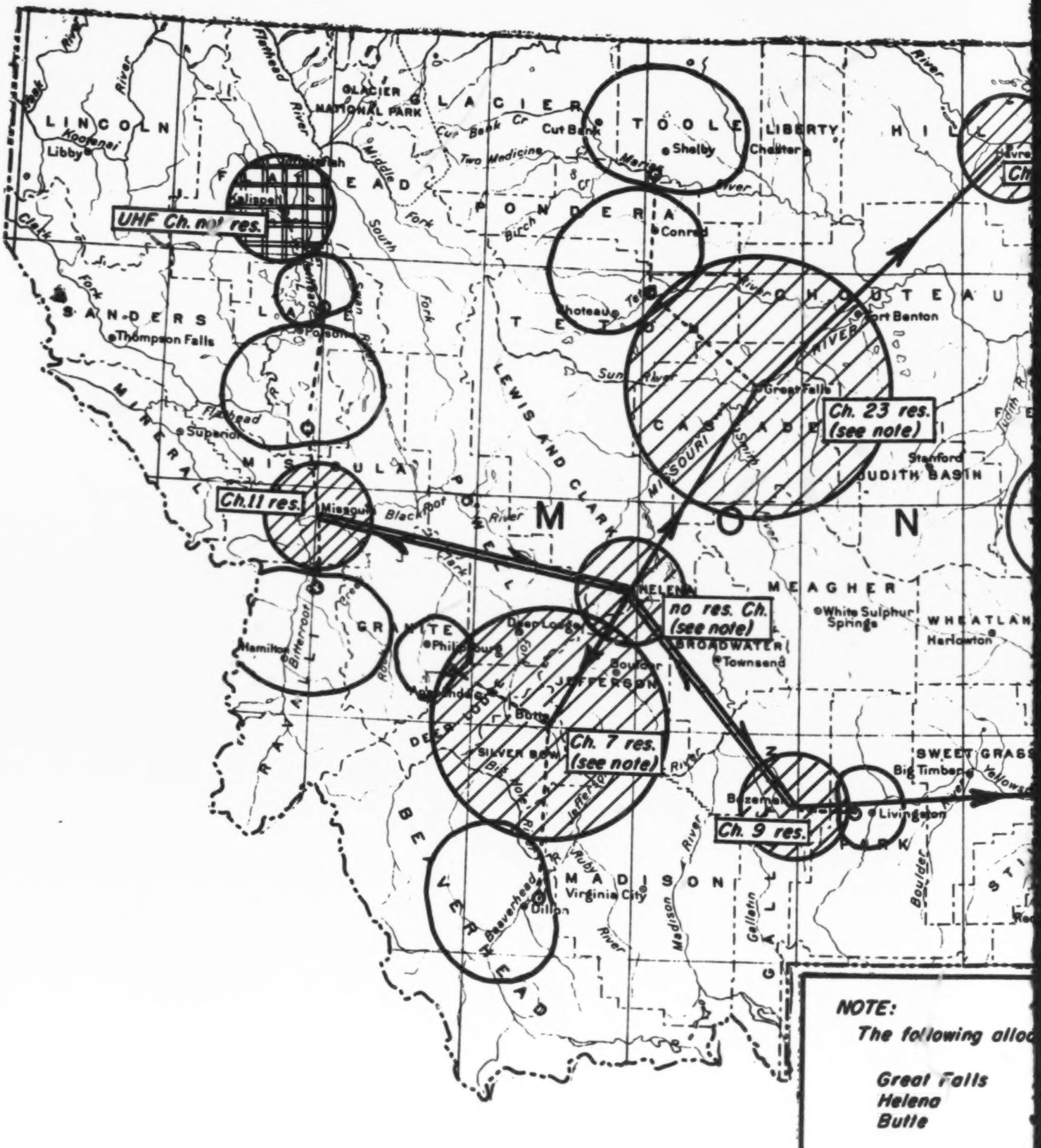
LANNED


ILLINOIS
MISSOURI
INDIANA
OHIO
WEST VIRGINIA
VIRGINIA
KENTUCKY
TENNESSEE
NORTH CAROLINA
SOUTH CAROLINA
ARKANSAS
MISSISSIPPI
ALABAMA
GEORGIA
LOUISIANA
FLORIDA
Gulf of Mexico
12
56
14
48
34
15
9
8
2
4
10
30
7
13
11
3
5
St. Louis
Memphis
Nashville
Birmingham
New Orleans
Jacksonville
Tampa
Indianapolis
Chattanooga
Knoxville
Little Rock
Atlanta
Savannah
Tallahassee
Key West
SCALE IN MILES
0
50
100
150
200
250
300
350
400
450

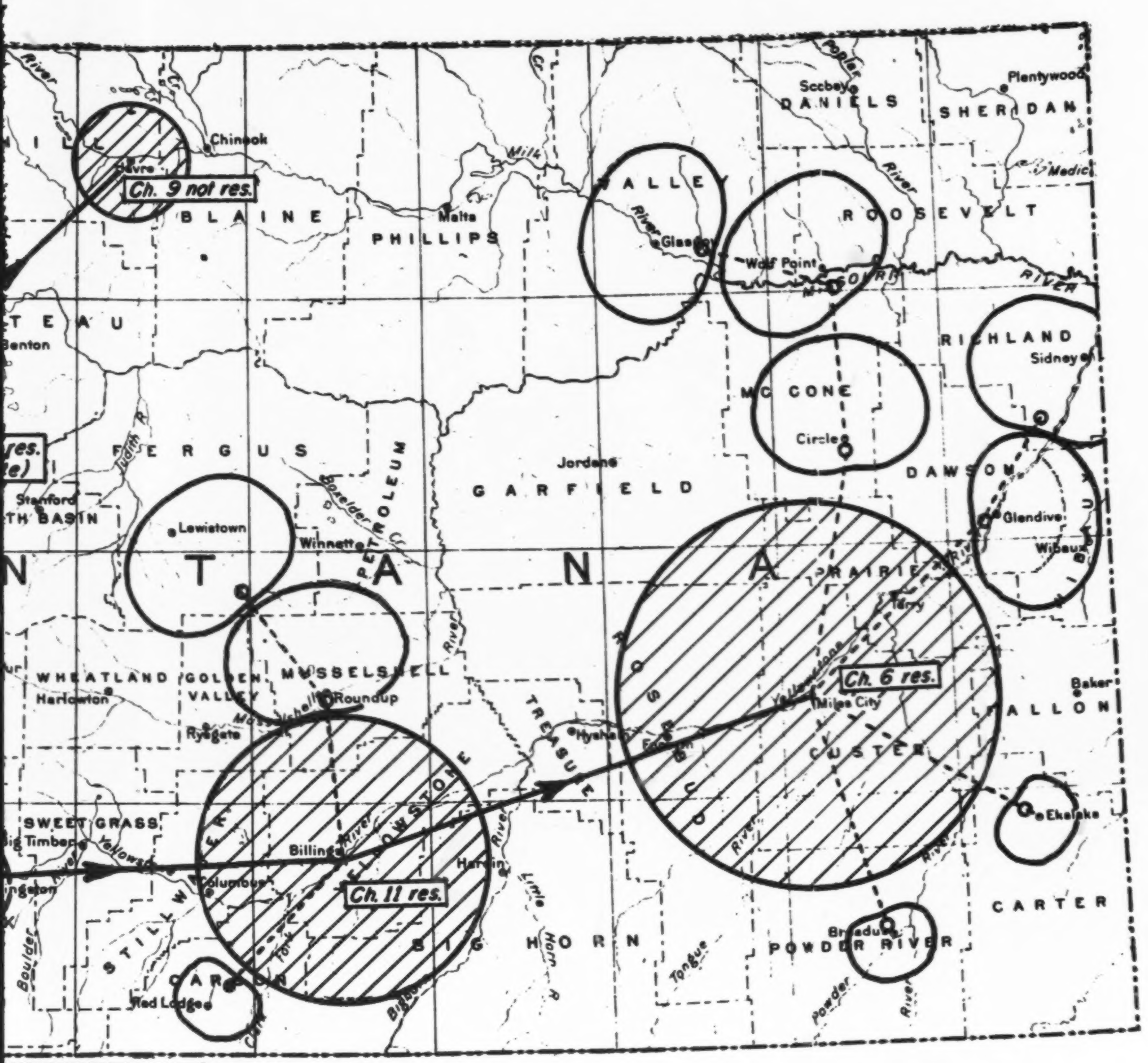


34
26
15
4
30
8
9
8
7
11
5
3
2
17
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Zanesville
Fairmont
Morgantown
Parkersburg
Clarksburg
Portsmouth
Huntington
Ashland
Charleston
Lexington
Charlottesville
Richmond
Lynchburg
Petersburg
Roanoke
Bluefield
Bristol
Danville
Burlington
Greensboro
Durham
Raleigh
Rocky Mount
Winston Salem
High Point
Johnson City
Oak Ridge
Knoxville
Asheville
Salisbury
Kannapolis
Gastonia
Charlotte
Fayetteville
Spartanburg
Rock Hill
Greenville
Wilmington
Columbia
Athens
Augusta
Charleston
Macon
Columbus
Albany
Savannah
Jacksonville
Tallahassee
Gainesville
Daytona Beach
Orlando
Lakeland
Tampa
St. Petersburg
Lake Okeechobee
West Palm Beach
Key West
A t l a n
i c o
400
450

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS


LINCOLN
Libby
Kootenai
GLACIER NATIONAL PARK
GLACIER
TOOLE
LIBERTY
HILL
Cut Bank
Shelby
Chester
Kalispell
UHF Ch. not res.
FLATHEAD
PONDERA
Conrad
SANDERS
Thompson Falls
LAKE
Polson
TETON
Choteau
CHOUTEAU
Fort Benton
Great Falls
CASCADE
Ch. 23 res. (see note)
MINERAL
Superior
MISSOULA
Missoula
Ch. 11 res.
POWELL
LEWIS AND CLARK
Stanford
JUDITH BASIN
MONTANA
Helena
no res. Ch. (see note)
MEAGHER
White Sulphur Springs
WHEATLAND
Harlowton
BROADWATER
Townsend
GRANITE
Philipsburg
Hamilton
RAVALLI
Deer Lodge
Anaconda
Boulder
JEFFERSON
Butte
DEER LODGE
SILVER BOW
Ch. 7 res. (see note)
SWEET GRASS
Big Timber
Bozeman
Livingston
Ch. 9 res.
PARK
BEAVERHEAD
Dillon
MADISON
Virginia City
GALLATIN
NOTE:
The following alloc
Great Falls
Helena
Butte
Diagonal cross-h
Plaid "
Open patterns =
Solid lines repre
Double lines signi
Dashed lines sig

641712 O - 62 (Follows Text) No. 5


Chinook
Havre
Ch. 9 not res.
BLAINE
Malta
PHILLIPS
VALLEY
Glasgow
Scobey
DANIELS
Plentywood
SHERIDAN
ROOSEVELT
Wolf Point
MISSOURI RIVER
Milk
Poplar
Medic
Benton
TEAU
RICHLAND
Sidney
MC CONE
Circle
FERGUS
Judith R.
Jordan
GARFIELD
DAWSON
Glendive
Wibaux
Stanford
TH BASIN
Lewistown
Winnett
PETROLEUM
Boxelder Cr.
N T A N A
PRAIRIE
Terry
WHEATLAND
Harlowton
GOLDEN VALLEY
MUSSELSHELL
Roundup
Ryegate
Musselshell
TREASURE
Hysham
Forsyth
ROSEBUD
Yellowstone
Ch. 6 res.
Miles City
CUSTER
Baker
FALLON
Ekalaka
SWEET GRASS
Big Timber
Yellowstone
Billings
Columbus
STILLWATER
YELLOWSTONE
River
Hardin
Ch. 11 res.
BIG HORN
Little Horn R.
Tongue
Powder
River
Broadus
POWDER RIVER
CARTER
CARBON
Red Lodge
Boulder
ingston
res.
te)
10 0 20 40 60 80 100 MILES

following allocation changes are assumed:-

	Delete	Add
eat Falls	23 res.	10 res.
lena	10 not res.	7 res.
tte	7 res.	2 res.

gonal cross-hatching = VHF Broadcast Station
d " " = UHF " "
n patterns = 10 & 100 watt UHF Translators

id lines represent microwave relay circuits.
ble lines signify reversible microwave circuit.
hed lines signify off-the-air relay.

FIG. 10

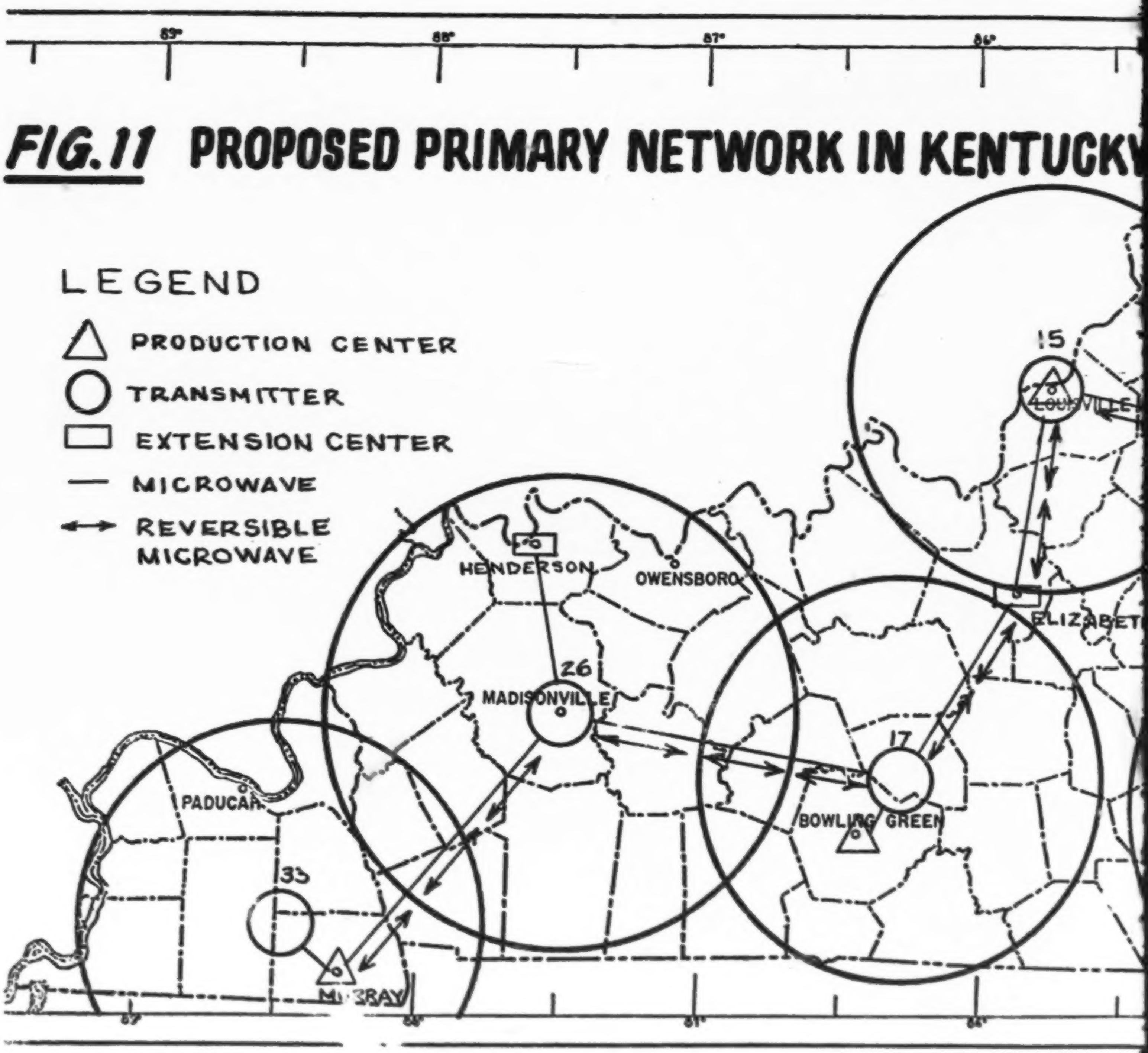
THE MONTANA ETV PROJECT

PROPOSED MONTANA STATE ETV NETWORK

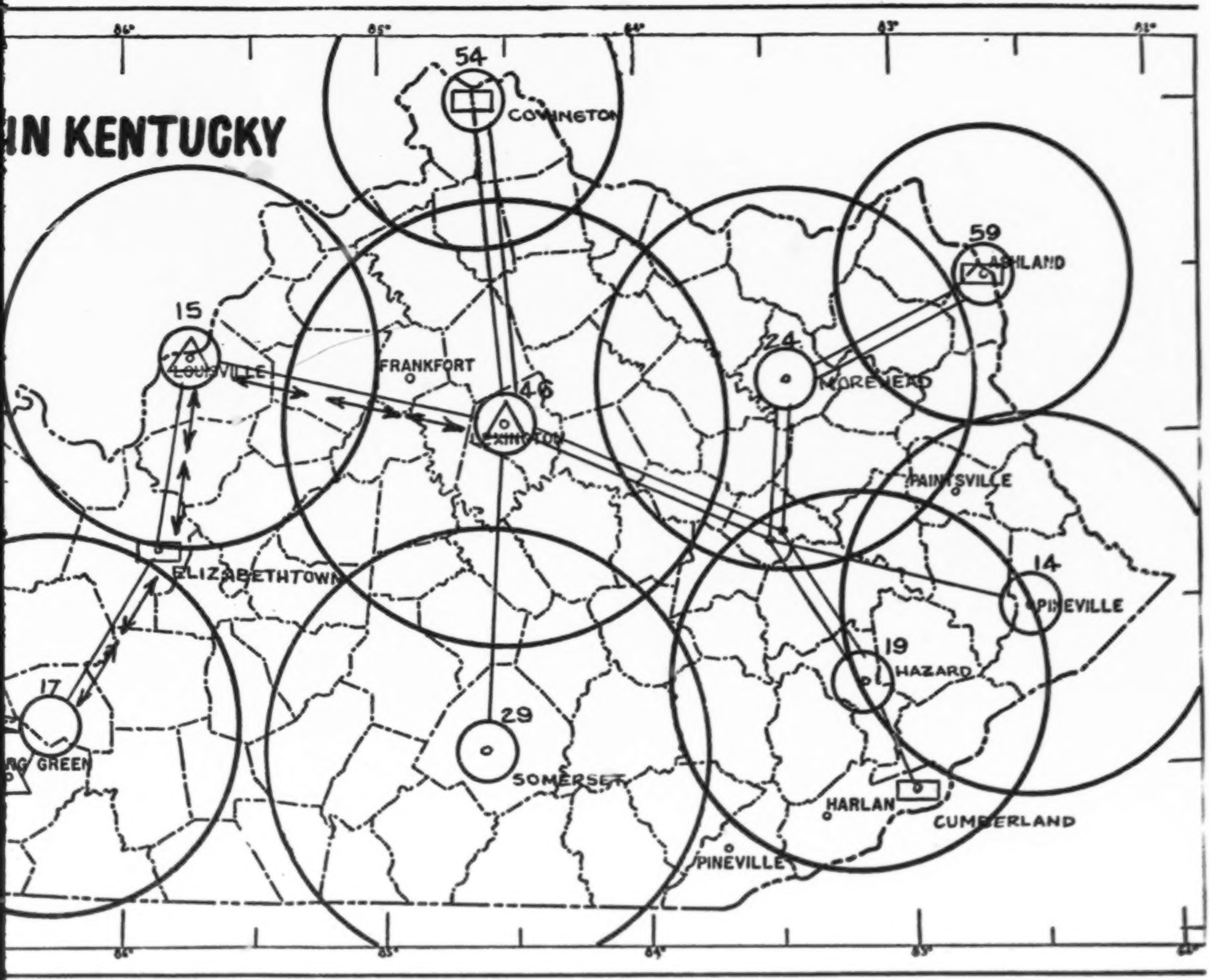
ARCHER S. TAYLOR
CONSULTING RADIO ENGINEER
POST OFFICE BOX [illegible]
MISSOULA, MONTANA

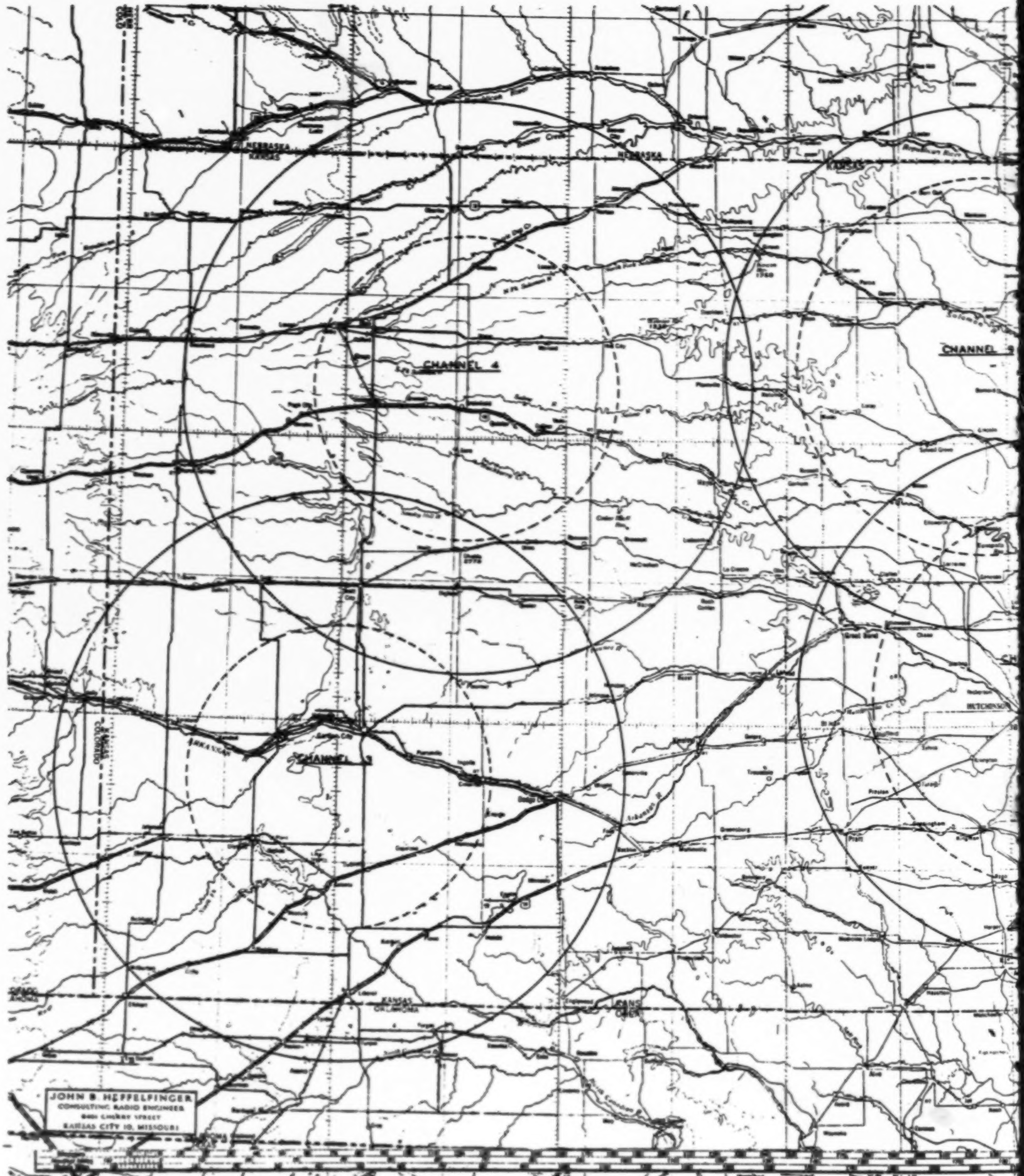
FEB. 21, 1961

FIG.11 PROPOSED PRIMARY NETWORK IN KENTUCKY


89°
88°
87°
86°
LEGEND
PRODUCTION CENTER
TRANSMITTER
EXTENSION CENTER
MICROWAVE
REVERSIBLE MICROWAVE
15
LOUISVILLE
HENDERSON
OWENSBORO
ELIZABET
26
MADISONVILLE
17
BOWLING GREEN
PADUCAH
33
MURRAY

641712 O - 62 (Follows Text) No. 6


IN KENTUCKY
86°
85°
84°
83°
82°
54
COVINGTON
59
ASHLAND
15
LOUISVILLE
FRANKFORT
46
LEXINGTON
24
MOREHEAD
PAINTSVILLE
ELIZABETHTOWN
14
PIKEVILLE
19
HAZARD
17
BG GREEN
29
SOMERSET
HARLAN
CUMBERLAND
PINEVILLE


NEBRASKA
KANSAS
CHANNEL 4
CHANNEL 9
CHANNEL
Garden City
ARKANSAS R.
HUTCHINSON
Great Bend
COLORADO
KANSAS
OKLAHOMA
JOHN B. HEFFELFINGER
CONSULTING RADIO ENGINEER
CHERRY STREET
KANSAS CITY 10, MISSOURI

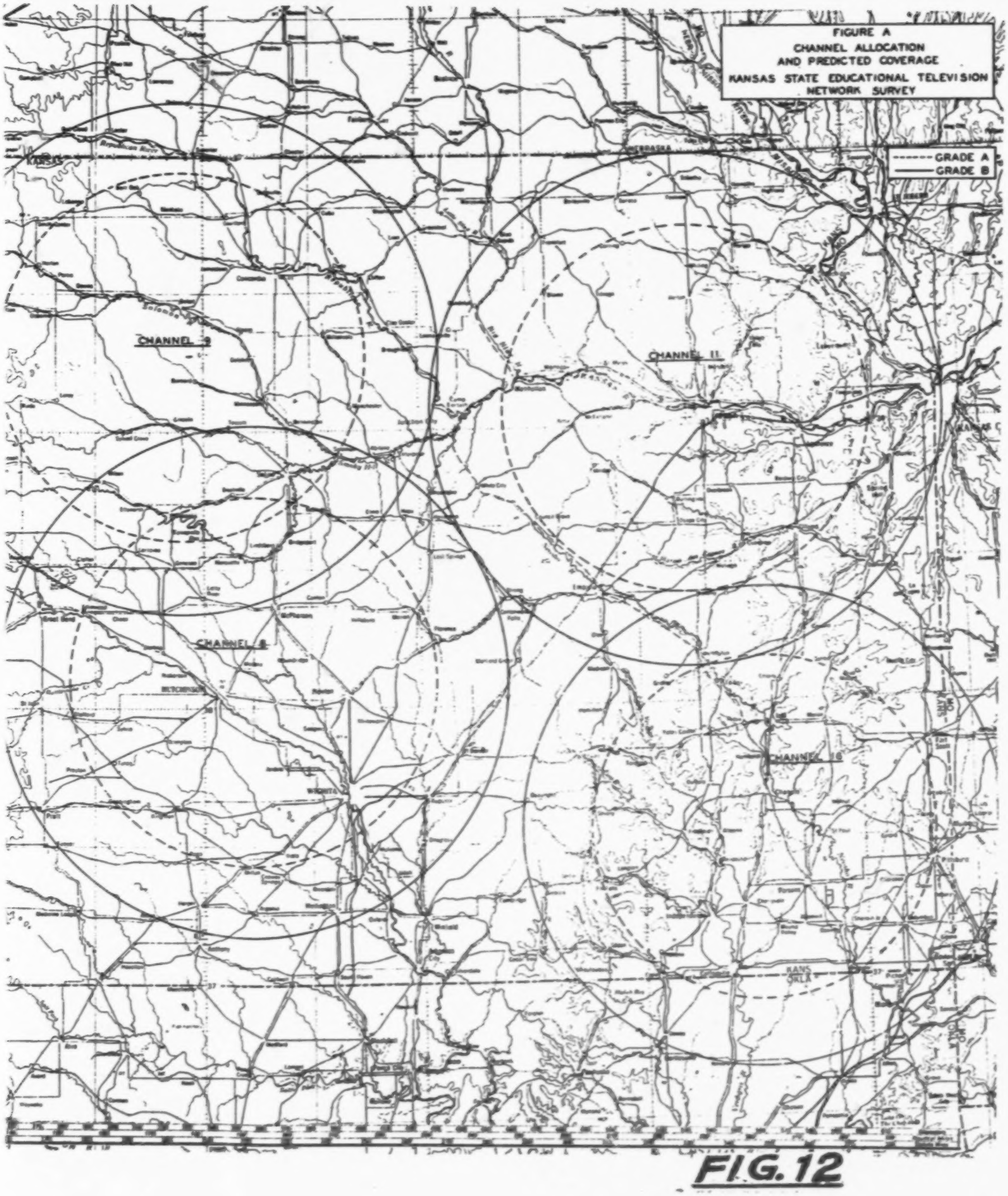
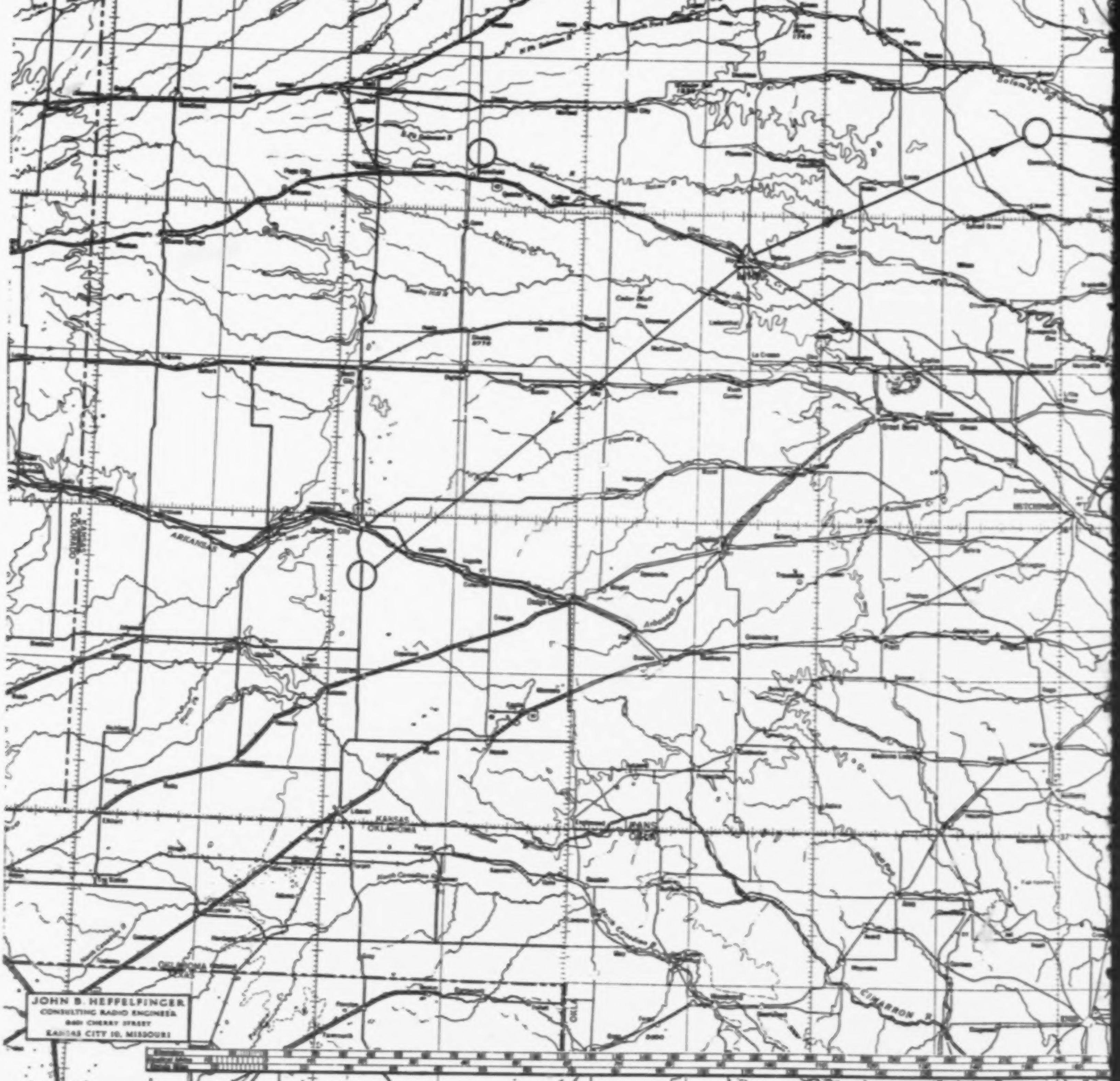


FIGURE A
CHANNEL ALLOCATION
AND PREDICTED COVERAGE
KANSAS STATE EDUCATIONAL TELEVISION
NETWORK SURVEY
GRADE A
GRADE B
CHANNEL 9
CHANNEL 11
CHANNEL 8
CHANNEL 16
NEBRASKA
WICHITA
HUTCHINSON

FIG. 12


NEBRASKA
KANSAS
COLORADO
KANSAS
ARKANSAS
HUTCHINSON
KANSAS
OKLAHOMA
OKLAHOMA
TEXAS
CIMARRON R

JOHN B. HEFFELFINGER
CONSULTING RADIO ENGINEER
8401 CHERRY STREET
KANSAS CITY 10, MISSOURI

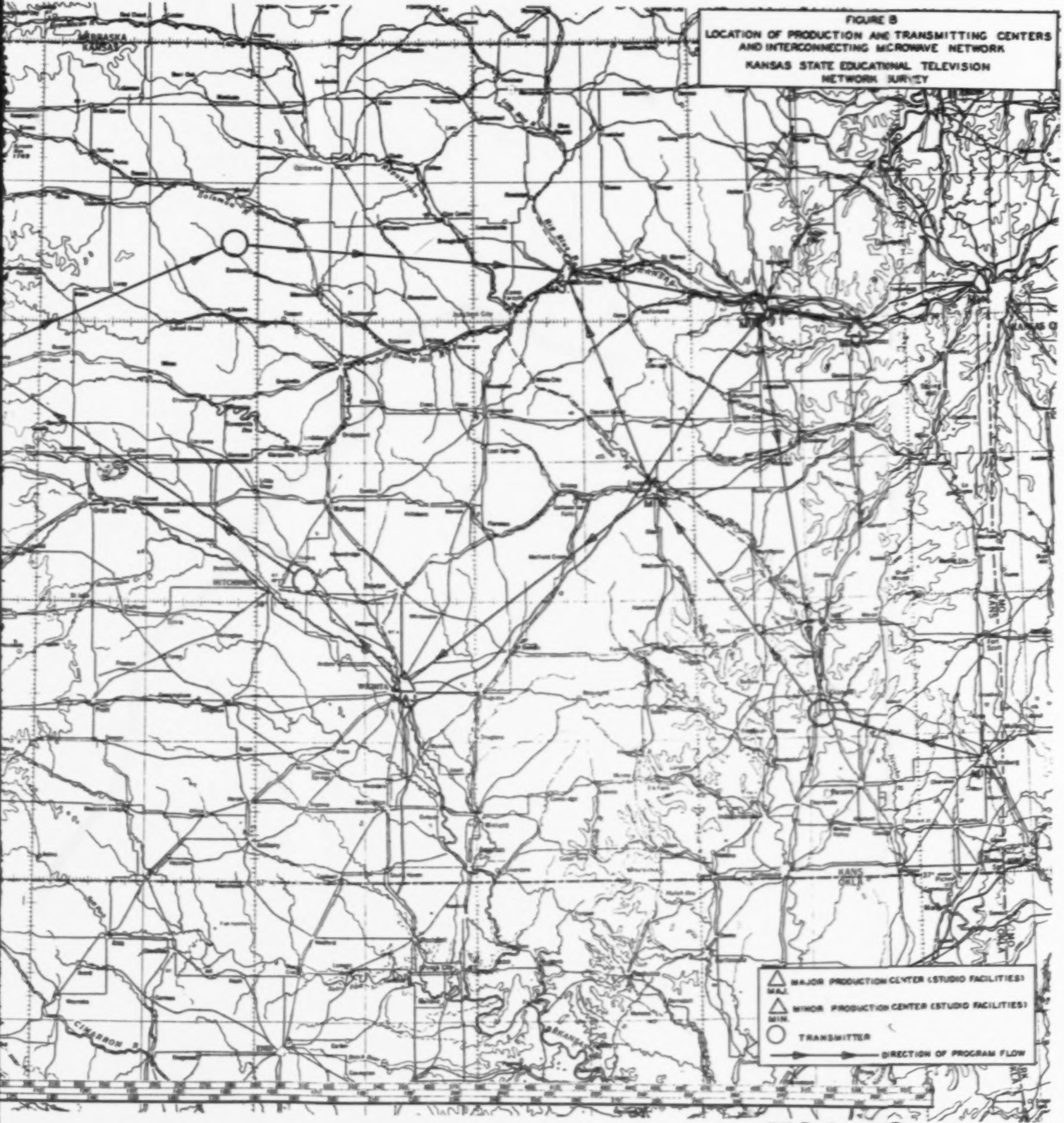
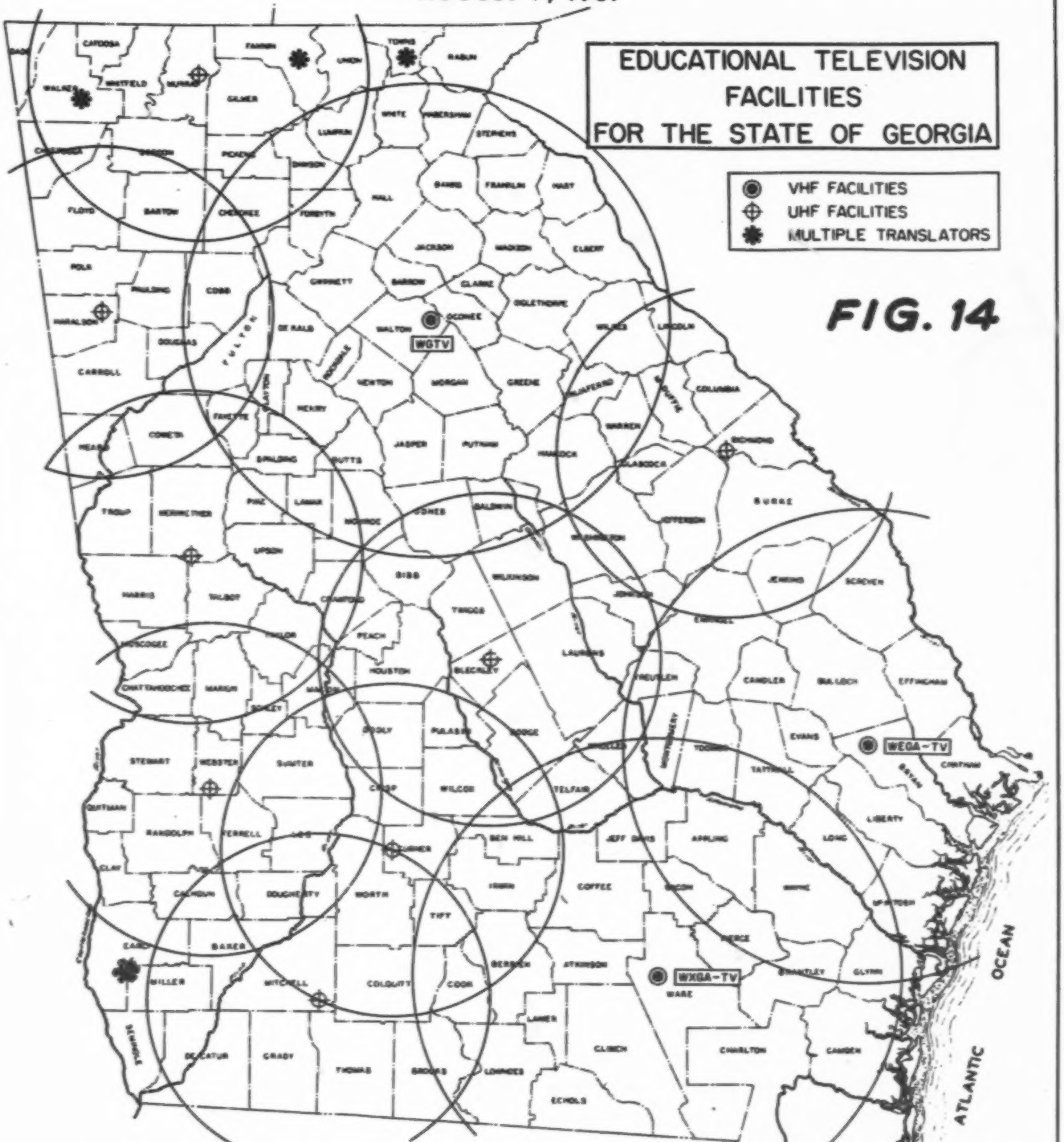


FIGURE 8
LOCATION OF PRODUCTION AND TRANSMITTING CENTERS AND INTERCONNECTING MICROWAVE NETWORK
KANSAS STATE EDUCATIONAL TELEVISION NETWORK SURVEY
NEBRASKA
KANSAS
WICHITA
HUTCHINSON
CIMARRON R.
MAJOR PRODUCTION CENTER (STUDIO FACILITIES)
MAJ.
MINOR PRODUCTION CENTER (STUDIO FACILITIES)
MIN.
TRANSMITTER
DIRECTION OF PROGRAM FLOW

FIG.13

PROPOSED NETWORK OF EDUCATIONAL TELEVISION STATIONS
APPROVED BY THE GEORGIA STATE BOARD OF EDUCATION

AUGUST 7, 1961


DADE
CATOOSA
FANNIN
TOWNS
UNION
RABUN
WALKER
WHITFIELD
MURRAY
GILMER
LUMPKIN
WHITE
HABERSHAM
STEPHENS
CHATTOOGA
GORDON
PICKENS
DAWSON
BANKS
FRANKLIN
HART
FLOYD
BARTOW
CHEROKEE
FORSYTH
HALL
JACKSON
MADISON
ELBERT
POLK
PAULDING
COBB
GWINNETT
BARROW
CLARKE
OGLETHORPE
HARALSON
DE KALB
WALTON
OCONEE
WGTV
WILKES
LINCOLN
DOUGLAS
FULTON
ROCKDALE
CLAYTON
CARROLL
NEWTON
MORGAN
GREENE
TALIAFERRO
McDUFFIE
COLUMBIA
HENRY
WARREN
RICHMOND
HEARD
COWETA
FAYETTE
SPALDING
BUTTS
JASPER
PUTNAM
HANCOCK
GLASCOCK
BURKE
TROUP
MERIWETHER
PIKE
LAMAR
MONROE
JONES
BALDWIN
WASHINGTON
JEFFERSON
UPSON
BIBB
WILKINSON
JOHNSON
JENKINS
SCREVEN
HARRIS
TALBOT
CRAWFORD
TWIGGS
EMANUEL
MUSCOGEE
TAYLOR
PEACH
HOUSTON
BLECKLEY
LAURENS
CHATTAHOOCHEE
MARION
MACON
SCHLEY
TREUTLEN
CANDLER
BULLOCH
EFFINGHAM
DOOLY
PULASKI
DODGE
WHEELER
MONTGOMERY
TOOMBS
EVANS
WEGA-TV
STEWART
WEBSTER
SUMTER
TATTNALL
BRYAN
CHATHAM
QUITMAN
CRISP
WILCOX
TELFAIR
RANDOLPH
TERRELL
LEE
TURNER
BEN HILL
JEFF DAVIS
APPLING
LIBERTY
LONG
CLAY
CALHOUN
DOUGHERTY
WORTH
IRWIN
COFFEE
BACON
WAYNE
McINTOSH
TIFT
PIERCE
EARLY
BAKER
BERRIEN
ATKINSON
BRANTLEY
GLYNN
MILLER
MITCHELL
COLQUITT
COOK
WXGA-TV
WARE
LANIER
SEMINOLE
DECATUR
GRADY
THOMAS
BROOKS
LOWNDES
CLINCH
CHARLTON
CAMDEN
ECHOLS
ATLANTIC
OCEAN
20 0 20 40 60 80 100 120 MILES 140

EDUCATIONAL TELEVISION
FACILITIES
FOR THE STATE OF GEORGIA

- ◉ VHF FACILITIES
- ⊕ UHF FACILITIES
- ✱ MULTIPLE TRANSLATORS

FIG. 14

PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

610801